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Poetry

MILTON DICTATING HIS LAST POEM, SAMSON AGONISTES, TO HIS DAUGHTER. FROM THE PICTURE BY J. C. HORSLEY, R.A.



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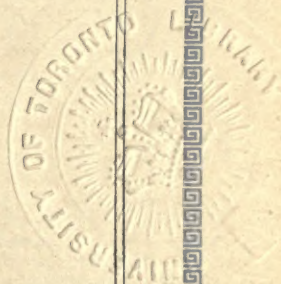
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HARMSWORTH'S UNIVERSAL ENCYCLOPEDIA

VOLUME 10

Pensnett. Town of Staffordshire, England. It is 2 m. from Dudley. The chief industries are coal-mining, and the making of iron, glass, and hardware. Pop. 5,400.

Pentacle. Five-pointed star, drawn with a continuous line, used by magicians and other occultists as a mystic emblem, and supposed to have power against evil spirits. It is also called a pentagram and a pentalpha.

Pentameter (Gr. *pente*, five; *metron*, measure). In prosody, a metrical line of 5 feet of whatever kind. In English heroic verse it consists of five accentual iambuses. In classical elegiac verse, composed of alternate hexameters and pentameters, the pentameter is divided into two clean-cut halves of 2½ feet each, of which the first may be dactylic or spondaic, but the second must contain two dactyls. Schiller defined the two in an illustrative distich which Coleridge reproduced in English as follows:

In the hexameter rises the fountain's
silvery column;
In the pentameter aye falling in melody
back.

See Poetry.

Pentane. Hydrocarbon of the paraffin series (C_5H_{12}). It occurs in considerable quantity in American crude petroleum, and is prepared from light American petroleum by purifying the fraction which distils over at 45° C. Pentane is employed in the standard lamp used in testing the illuminating power of coal gas, a mixture of air and pentane vapour producing a light equivalent to that given by 10 standard candles.

Pentateuch (Gr. *pente*, five; *teuchos*, volume). Term used by Christian scholars from the time of Tertullian and Origen to designate collectively the first five books of the O.T. (Genesis, Exodus, Leviticus, Numbers, Deuteronomy). These books were called by the Jews "the five-fifths of the law." Some scholars contend that the sixth book (Joshua) is inseparable from the other five, and that it is better to use the term hexateuch. See Bible; Hexateuch.

Pentathlon. Series of five events in the athletic festivals of ancient Greece—foot race, long jump, throwing the discus and the javelin, and wrestling. A special prize was awarded to the competitor who excelled in the series.

Pentaur, POEM OF. Ancient Egyptian epic composition. Written by a court poet of unknown name, it describes Rameses II's Hittite campaign, culminating in the battle of Kadesh, about 1288 B.C. Versions were incised upon temple walls at Luxor and Karnak. From a papyrus copy made by a scribe of that name, now in the British Museum, E. de Rougé mistakenly attributed the authorship to Pentaur.

Pentecost (Gr. *pentecostē*, the 50th). Jewish festival, also known as the Feast of Weeks. It is observed on Sivan 6-7, and was so called because it was celebrated 50 days from the morrow of the Sabbath after the Passover (*q.v.*). It corresponds with the Christian Whitsuntide (*q.v.*).

Pentelicon OR PENTELIKON OROS. Mt. in ancient Greece, 12 m. N.E. of Athens. It was famous for its quarries of white marble, which are still worked.

Pentland, JOHN SINCLAIR, 1ST BARON (1860-1925). British politician. Son of Capt. G. Sinclair, he was born July 7, 1860, and educated at Edinburgh Academy and Wellington, afterwards passing through Sandhurst into the army, 5th



1st Baron Pentland,
British politician
Elliott & Fry

Lancers, in 1879. He served in the Sudan, 1885. He was M.P. for Dumbartonshire, 1892-95, and for Forfarshire, 1897-1909. A close friend of Campbell-Bannerman, Sinclair was made secretary for Scotland in 1905, and in 1912, having been a peer since 1909, became governor of Madras, resigning, 1919. He died Jan. 11, 1925.

Pentland Firth. Navigable strait separating the Orkney Islands from Caithness, Scotland, and connecting the North Sea with the Atlantic Ocean. Its passage is rendered dangerous by a strong tidal current flowing from W. to E. at the rate of from 6-10 m. an hour, and by eddies or whirlpools at the change of tide. The channel measures 14 m. in length and from 6 to 8 m. in breadth. The Pentland Skerries, at the E. entrance, con-

sist of two islets, on one of which is a lighthouse, with light visible at 19 m., and of a number of rocks.

Pentland Hills. Range in Scotland. It extends for about 16 m. S.W. through Edinburghshire, Peeblesshire, and Lanarkshire, and has a breadth of from 4 to 6 m. The highest summits are Scald Law (1,898 ft.) and Carnethy (1,980 ft.). Springs in the hills provide Edinburgh with excellent water. See Edinburgh.

Pentonville. Dist. of London. A ward of the bor. of Islington, and once an outskirt of Clerkenwell, it was, by gift of the Mandeville family, a possession of the priory of St. John of Jerusalem. It is named after the estate of Henry Penton, M.P. (d. 1812), which began to be built upon about 1773.

Pentonville Prison. English convict prison. It was erected in 1842 by Sir Joshua Jebb, in the Caledonian Road, Islington, London, and was the first of what were known as model prisons to deal with the new solitary confinement of convicts. See Prison.

Pentstemon. Genus of herbaceous plants, belonging to the order Scrophulariaceae, also known as beard tongue (*q.v.*).

Penumbra (Lat. *pene*, almost; *umbra*, shade). The lighter shadow surrounding the darker central portion of any shadow thrown by an opaque object. The central dark shadow is known as the umbra. It is specifically applied in astronomy to the shadow thrown by the earth or moon. Where the penumbra of the moon falls on the earth, a partial eclipse of the sun is seen; within the umbra a total eclipse is seen; in an annular eclipse of the sun the umbra of the moon falls on the earth. See Eclipse.

Penza. Govt. of Central Russia. It is bounded by the govts. of Nijni-Novgorod, Simbirsk, Saratov, and Tambov, and its area is about 15,000 sq. m. The chief occupations and industries are agriculture and cattle-breeding, distilling, wool-beating, pottery, cloth, sugar, and paper making.

Penza. Town of Central Russia, capital of the govt. of the same name. It stands at the confluence of the rivers Penza and Sura, and is on the Morshansk-Syzran rly. It is the seat of a Greek Catholic bishop. Pop. 80,000.

Penzance. Mun. bor., market town, seaport, and watering-place of Cornwall, England. It stands at the head of Mount's Bay, 325 m. from London and 8 m. from Land's End, with a station on the G.W. Rly. The most western town in England, Penzance has a very mild climate

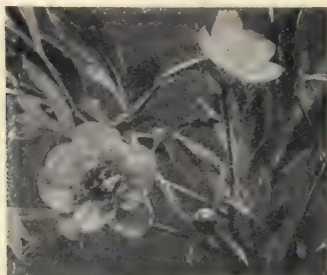


Penzance. Seal of the borough council

and is much visited, both in summer and winter. In the public buildings are several museums; other edifices are the free library and school of art, market house, and infirmary. There is an old market cross, the Morrab pleasure grounds, and a statue to Sir Humphry Davy, a native. Its harbour, formed by two piers, can accommodate large vessels, and has wet and dry docks. St. Michael's Mount and the Scilly Isles can be visited from here. The industries include fishing for mackerel and pilchard, and the shipping of tin, etc. Penzance began as a fishing centre and later was made a port. It was damaged by the Spaniards in 1595, and was made a borough in 1614. From 1663 to 1838 it was one of the towns where tin was coined. The name is derived from two Cornish words, *pen*, head, and *zawn*, creek. It has been assumed that it was derived from *sans*, holy; hence the head of S. John the Baptist in the arms. Market day, Thurs. Pop. 12,200.

Peonage (Sp. *peon*, a day-labourer). Term used for the system of labour once prevalent in Spanish America. Under the system the Indians were given the status of minors by the Spanish government, with the intention of protecting them from oppression. It had exactly the opposite effect. The system spread to the U.S.A., but was abolished in 1867. The name *peon* survives for a workman of native or mixed blood.

Peony (*Paeonia*). Genus of hardy perennial herbs, some of which are evergreen, of the natural order



Peony. Leaves and flowers of *Paeonia lutea*, a Chinese variety



Penzance, Cornwall. Town and harbour from the south pier; on the left is S. Mary's Church

Frith

Ranunculaceae. They are natives of Asia, S. Europe, and America. *P. officinalis* and *P. albiflora* were introduced into Britain in 1548. They range in height from 2 to 5 ft., and their colours vary from white to crimson, though there is a yellow variety. They are raised from seed sown in autumn, in pots or pans of sandy soil in cold frames, and planted out in the spring. The taller species (*P. moutan*), known as the tree peony, should be planted in spring in deep, rich soil, and protected from frosts with a layer of fern, bracken, straw, or other similar material.

People's Bank. Name given to a system of cooperative banking, suited to the means of the small investor. It was introduced into Germany by Franz Schulze-Delitzsch, in 1850, and proved very successful. Depositors paid a monthly subscription of 5d., after an initial deposit of 2½d. The term is also loosely applied to other banks established on a cooperative basis. See Municipal Bank; Penny Bank.

People's Palace. Institution in Mile End Road, E. London, England. The original foundation was a bequest by J. E. B. Beaumont (1774-1840), to provide for the recreation and moral and intellectual advancement of the working classes in the East End of London, and a start was made with a building in Beaumont Square. Large donations to the endowment fund were subsequently made, the Drapers' Company being a conspicuous benefactor, and by June, 1886, a sum of £75,000 had been raised. The existing buildings, opened in 1887, include the

Queen's Hall, where industrial and other exhibitions and concerts are held, a technical school (now the East London College, attached to the University of London), and other equipment for education, recreation, etc. Sir Walter Besant (*q.v.*) took an active interest in the undertaking, of which he gave a

suggestive forecast in his novel, *All Sorts and Conditions of Men*, 1882.

Peoria. City of Illinois, U.S.A., the co. seat of Peoria co. It stands on the W. bank of the Illinois river, 160 m. by rly. S.W. of Chicago, and is served by the Chicago, Burlington, and Quincy, and other rlys. It has a R.C. cathedral, and upwards of 400 acres of parks. It carries on a busy river trade, and has manufactures of glucose, starch, flour, wagons, motor-cars, foundry products, and agricultural implements. Founded in 1819, and named after the Peoria Indians, Peoria was incorporated, 1835, and became a city, 1845. Pop. 76,100. See *The History of Peoria*, 1870; *Peoria, City and County*, J. M. Rice, 1912.

Peper Harow OR PEPPER HARROW. Parish of Surrey, England. It is on the Wey, 3 m. W. of Godalming. Called Piperherge in the Domesday Book, and supposed to derive its name from a family of the name of Pepard, or Pipard, the manor, which belonged in turn to the Brocas, Covert, and Holles families, and to John, earl of Clare, was acquired in 1713 by Alan Brodrick, Viscount Middleton, in the hands of whose descendants it has since remained. In the park is the Early English church of S. Nicholas, with ancient brasses.



People's Palace, London. Main front of the building, in Mile End Road

Pepi OR **PEPY**. Name of two Egyptian kings of the VIth dynasty. Pepi I, the Phiops of Manetho, during a vigorous reign of 50 years, worked the Sinai turquoise mines and the Assuan granite quarries, and undertook a maritime expedition up the Palestine coast. At Hieraconpolis Quibell unearthed a life-size bronze of him, with eyes of brilliant inlay, and an inscribed sceptre of pure copper.



Peppermint. Branch with foliage and flowers. Inset, single flower

Pepin OR **PIPPIN**. Name of three Frankish rulers. Pepin I was mayor of the palace to the king of Austrasia early in the 7th century. His grandson, Pepin II, or Pepin



Pepper Tree. Leaves and fruit. Inset, flowers

of Heristal, made himself the most powerful person in the Frankish kingdoms, both of which, Neustria and Austrasia, came under his power, although he did not dethrone the existing kings. He died Dec. 16, 714. His grandson, Pepin the Short, was the son of Charles Martel and the father of Charlemagne. In 751 he removed the Frankish king, Childeric, and made himself king, thus paving the way for the empire of Charlemagne. He died Sept. 24, 768. See Carolingians; France; Franks.

Pepper (*Piper nigrum*). Climbing shrub of the natural order Piperaceae. It is a native of the E. Indies, and has a wavy stem and large, broad oval, alternate leaves.

The minute flowers—without sepals or petals—are crowded in hanging sprays. The little roundish red fruits ultimately become black, when they are the peppercorns of commerce. Ground to powder they form black pepper; white pepper is produced from fruit, of which the outer fleshy coat has been removed before ripening.

Peppercorn. Berry of the pepper plant, used as a synonym for something of little or no value. A peppercorn rent is a term in English law for a nominal rent.

Pepper Hill. Hill of France more generally known as Poivre Hill (*q.v.*), or La Côte du Poivre.

Peppermint (*Mentha piperita*). Strong-scented perennial herb of the natural order Labiatae. It is a native of Europe, and has creeping underground stems which send vertical branches into the air. The opposite, coarsely toothed leaves are oval or broad lance-shaped, the flowers purple, in loose spikes. Oil of peppermint, extensively used in medicine as a gastric stimulant in certain forms of dyspepsia, is distilled from the leaves. See Mint.

Pepper-root (*Dentaria diphylla*). Perennial herb of the natural order Cruciferae. It is a native of N. America, and has a long branching rootstock. The leaves are divided into three oblong-oval, coarsely toothed leaflets, and the four-petalled flowers are white. The crisp rootstock has a hot, pungent flavour like that of watercress.

Pepper Tree (*Drimys aromatica*). Small aromatic evergreen tree of the natural order Magnoliaceae. A native of Tasmania, it has oblong leaves with transparent dots, and white flowers, the sexes being separate. The many-seeded, globular fruit is sometimes used as a substitute for pepper, but all parts of the tree are pungent to the taste. See Peruvian Mastic Tree.

Pepsin (Gr. *pepsis*, cooking). Enzyme or ferment present in the gastric juice of the stomach. It acts upon protein, the essential

constituent of meat, converting it into simpler substances in the process of digestion. Pepsin only acts in this way in the presence of free hydrochloric acid. For medicinal purposes it is extracted from the stomach of freshly killed pigs and the rennet bags of sheep. See Digestion; Pancreas.

Peptones. Substances formed from protein by the action of pepsin in the gastric juice, or trypsin in the pancreatic secretion, during digestion. They help to nourish and build up the tissues. See Protein.

Pepys, SAMUEL (1633-1703). English diarist and admiralty official. Born in London. Feb. 23.



After Kneller

1633, fifth son of John Pepys, tailor and member of an old East Anglian family, he was educated at S. Paul's School, London, and Trinity Hall and Magdalene College, Cambridge. Befriended by a relative, Sir Edward Montagu, 1st earl of Sandwich, he held several offices in connexion with the admiralty, including that of secretary, and was imprisoned in the Tower in 1679, and in the Gatehouse, Westminster, 1690, on flimsy charges. He represented Castle Rising and Harwich in Parliament, and proved an untiring and patriotic official. He was master of Trinity House, 1676 and 1685; master of the Clothworkers' Company, 1677; and president of the Royal Society, 1684-86. Superseded in March, 1689, he died at Clapham, May 26, 1703, and was buried in the church of S. Olave, Hart Street.

Among the MSS. preserved with Pepys's library at Magdalene College was that of his famous Diary, written in cipher, Jan. 1, 1659-May 31, 1669. In this work, the most intimate human document of



Pepper. Leaves and pendulous flower sprays. Inset, fruit

its kind, he supplies a vivid picture of his own character, his insatiable inquisitiveness, meannesses, and vanity, reveals also his higher qualities, to which his brother diarist, John Evelyn, pays a warm tribute, and throws invaluable sidelights on the court, official, and social life of his time. He was a student of music, in which he found consolation in trouble, and was an inveterate playgoer. He suffered from stone and from failing eyesight. The Diary was first deciphered by John Smith, 1819-22, and first published 1825. *Pron. Peeps. See Loving Cup.*

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Pera. Suburb of Constantinople. Situated on the N. of the Golden Horn and adjoining Galata, it is the European quarter, containing the embassies, churches, and principal shops, the last being centred round the Grande Rue de Pera which traverses the suburb. Near the Petits Champs, a public park overlooking Stambul and the

Penang, and lies between Kedah and Siam on the N. and Selangor on the S., and has a long coast on the Strait of Malacca. The chief river is the Perak. Tin is mined at Taiping and Ipoh. Rubber is cultivated, especially near Matang. The main W trunk road and rly. of Malaya cross the state through



Perak, Federated Malay States. Characteristic scenery on the Perak river

Taiping, Kualakangsar, and Ipoh. Matang is on a branch rly. from Taiping, Telok Anson on another from Tapah Road. Rice is grown in the valleys, with orchards surrounding the paddy fields. In Krian in the N.W. rice is grown for export under a government irrigation scheme.

In 1826 Britain and Siam agreed by treaty that the native Malay ruler of Perak should be left undisturbed. In 1874, by the treaty of Pangkor, the sultan agreed to the appointment of a British resident; the resident was murdered in 1875;

his three children, A, B, and C, for life, and after their death amongst their children *per stirpes*. A has one child; B has two children; C has three children. A's child will inherit one-third; B's two children one-third between them; and C's three children one-third amongst them. Had the division been *per capita* and not *per stirpes*, all the six grandchildren of X would have had equal shares.

Perception (Lat. *per*, through, thoroughly; *capere*, to take, grasp). A philosophical term of various meaning. It was formerly used for cognition (knowledge), or as the equivalent of consciousness generally. Again, it was limited to the

act of perceiving anything by the senses. More accurately, it is the mental process which refers sensations to an object which is identified as having aroused previous similar sensations—a chair, table, tree. Perception is more complex than mere sensation (*q.v.*) and involves earlier experience; it is more stable than the idea of a thing, which in the absence of the object is liable to modification. Perception is less definite than apperception (*q.v.*). See *Metaphysics*.

Perceval, Sir. In medieval romance, a knight of the Arthurian cycle and central figure of one of the Grail romances. The son of a knight who has been slain, he is brought up by his mother in the forest, where he grows up uncivilized. Brought to court, he slays an enemy of the king, and after many adventures recovers his father's estate. See *Grail, Holy*; consult also *The Legend of Sir Perceval*, 2 vols., J. L. Weston, 1906-9; *Sir Perceval of Galles*, R. H. Griffith, 1911.

Perceval, SPENCER (1762-1812). British statesman. Born Nov. 1, 1762, second son of John Perceval, 2nd earl of Egmont, he was educated at Harrow and Trinity College, Cambridge. After some progress at the bar, he entered Parliament as Tory member for Northampton in 1796.



After Sir W. Beechey



Pera, Constantinople. General view of the European quarter, looking north

Golden Horn, is the British embassy. At the N. end of the Grande Rue are large barracks and the Taksim park. An underground cable lift descends from Pera to Galata and affords access to the Galata bridge and the quays. See *Constantinople*.

Perak. Most northerly of the Federated Malay States, British Malaya. It completely surrounds the Dindings, a detached portion of

British troops restored order and were eventually withdrawn in favour of an armed police. Its area is 7,800 sq. m. Pop. 494,000. See *Malaya*.

Per capita; per stirpes (Lat., by heads; by stocks). Terms used by lawyers in dealing with questions of inheritance. An example will best illustrate the meaning. X, by his will, leaves his property to trustees, to pay the income to

As a debater he proved himself an able opponent of Fox. On Pitt's retirement in 1801 Perceval became solicitor-general and attorney-general in 1802. He was leader of the House after Pitt's death in 1806, and became chancellor of the exchequer in 1807, to which office was added that of first lord of the treasury in Sept., 1809. Perceval was assassinated in the lobby of the House of Commons on May 11, 1812, by Bellingham, a crazy bankrupt. See Lives, Sir S. Walpole, 1874; P. Treherne, 1909.

Perch (*Perca fluviatilis*). Fresh-water fish of the order Acanthopterygii. It is a native of Britain,



Perch, a fish common in European and North Asiatic rivers

the greater part of Europe, and much of N. Asia. It is distinct in form, having a somewhat oblong body with the back humped above the pectoral fins. There are two dorsal fins, of which the anterior is the more conspicuous, both from its superior size and its strong, sharp-pointed rays. The back is coloured a dark ashy green, paling along the sides to a whitish tint below. At intervals along the sides is a series of broad vertical bands of dark brown; whilst the ventral, anal, and tail fins are some tint of red. Ordinarily the perch attains a length from 9 to 12 ins., and a weight of 2-3 lb. See Climbing Perch; Fish.

Perch (Lat. *pertica*, a pole). Measure of length, an alternative name for the rod or pole. See Rod.

Perche. One of the old provinces of France, later incorporated in the prov. of Maine. It was bounded N. by Normandy, W. by Maine, S. by Orléanais, and E. by the Île-de-France. It now forms the depts. of Orne and Eure-et-Loire. It gives its name to the Percheron (q.v.).

Perche, COL DE LA. Pass of the Pyrenees. It lies on the frontiers of France and Spain, beyond Mont-Louis, and between the valleys of the Têt and the Segre. The Spaniards were defeated here by the French in 1793. Its height is 5,175 ft.

Perched Blocks. In geology, name given to isolated masses of rocks which have been transported from their original source of for-

mation by glacial action. Such rocks, often also called erratic blocks, are typical in Alpine glacial districts, and are found scattered all over Europe and in parts of Great Britain.

Percheron. French breed of heavy draught horse, named from the province of Perche. Of a grey colour and standing about 16 hands, it has a large but neat head, magnificent neck, and clean limbs. It has been well described as a trotting cart-horse. Before the advent of motor traction, the London omnibus was conspicuously in charge of the percheron. See Horse, colour plate.

Perchloric Acid (HClO₄)

Colourless, fuming, volatile liquid obtained by the action of sulphuric acid on potassium perchlorate. When a few drops of the acid are placed on paper or wood, they at once set them on fire.

Percin, ALEXANDRE (b. 1846). French soldier. Born at Nancy, and educated at the École Polytechnique, he



Alexandre Percin, French soldier

joined the artillery, and served in the campaign of 1870, during which he was twice wounded. Captain at the age of 24, he afterwards held many important appointments, both military and civil, including that of inspector-general of firing instruction in the field artillery. On the outbreak of the Great War, he commanded the first region at Lille. Percin was mainly instrumental in perfecting the use of the "75" gun.

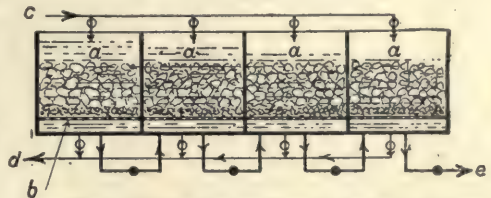
Percival, JOHN (1834-1918). British prelate and schoolmaster. Born at Brough, Westmorland, son of a yeoman, he was educated at Appleby and Queen's College, Oxford, of which he became a fellow. He was ordained in 1860, and became a master at Rugby. In 1862 he was made the first headmaster of Clifton College, and the creation of this



John Percival, British prelate
Elliott & Fry

public school was perhaps the great work of his life. President of Trinity College, Oxford, 1878-87, he then became headmaster of Rugby, 1887-95. In the latter year he was made bishop of Hereford, and he remained there until his death, Dec. 3, 1918. Percival was an advanced Liberal in lay and ecclesiastical politics and in theology. His biography was undertaken in 1921 by William Temple, bishop of Manchester. See Bishop Percival, E. M. Oakley, 1919.

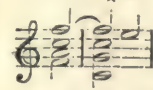
Percolation. Process of depriving vegetable matter of its soluble constituents, by allowing



Percolation applied in the manufacture of soda. See text

a solvent to trickle slowly through. The method is used in pharmacy for exhausting vegetable drugs of their active constituents, and the principle is employed in preparing coffee as a beverage. The vessel used is called a percolator. The figure shows how the principle of percolation is applied in the manufacture of soda in Shanks' vats. Ball soda or caliche, *a, a, a, a*, rests on a layer of ashes on the perforated false bottom, *b*, of the percolator. Fresh water is supplied through pipes, *c*, while *d* is a drain for weak liquor or waste water. The water percolates from vat to vat and issues at *e* as strong liquor.

Percussion. Musical term applied to the sounding of a discord after preparation and before resolution. Percussion instruments are those in which sound is set up by



being struck either with sticks (gong, and all drums), with hammers (pianoforte, dulcimer, glockenspiel, xylophone, etc.), with a steel rod (triangle), with clappers (bells), or, being in pairs, by being struck against one another (cymbals, castanets, etc.). Most of these have definite pitch of varying compass, but the gong, the bass and side drums, the tambourine, the triangle, the cymbals, and the castanets are merely noise-producers.

Percussion Cap. Small case of explosive, which may be ignited by the shock of a blow and is used to convey ignition to the propellant charge of a gun or rifle. Fulminate of mercury was discovered

by Howard in 1799, and about 15 years later the first successful percussion caps were made. In the old muzzle-loading guns the percussion cap was a separate copper case containing fulminate of mercury, which was placed on a hollow nipple, the bore of which communicated with the powder chamber. When the hammer fell, it exploded the fulminate, and the flash ignited the powder.

The next efforts to improve firearms were made with the object of combining powder, shot, and means of ignition in one cartridge, which could be inserted in the breech, and in 1836 the pin-fire breech-loader was introduced by Lefauchaux. In this construction a projecting pin at right angles to the main axis of the cartridge was driven in by the fall of the hammer, a pellet of fulminate being exploded by the shock and igniting the powder. Central-fire ammunition, in which a percussion cap was fixed in the centre of the base of the cartridge and used in central-fire hammer guns, was introduced by both English and French gunsmiths about 1853, but the first really successful gun on this principle was made by Daw, in 1861. In modern ammunition this principle is retained, and the cap containing the composition is driven by the hammer on to an anvil held in a cage in the cartridge case. The composition is usually a mixture of mercury fulminate (20); potassium chlorate (34); antimony sulphide (43), and sometimes a small addition of sulphur and black powder. *See* Ammunition; Cap Composition; Cartridge; Explosives; Needle Gun.

Percy. Name of a noble English family. It was founded by William de Percy, who was granted large holdings in the northern counties by William the Conqueror. He died near Jerusalem in 1096. Henry, 12th Baron Percy, was created earl of Northumberland, July 16, 1377. The estates and honours were twice forfeited and restored; on the second occasion, to the 4th earl in 1469. In 1537, as the heads of the family had taken part in the rising of that year, the title was lost, and it remained in abeyance until, in 1557, Thomas Percy was created, by patent, Baron Percy, and the next day earl of Northumberland, which title again lapsed, through failure of heirs male, in 1670.

The line of the Percys was then continued through the duchess of Somerset, daughter of the last earl, to Algernon Seymour, her son, subsequently duke of Somerset. He died in 1750, as earl of Northum-

berland, and his son-in-law, Sir Hugh Smithson, Bart., was created duke in 1766. The succession passed to his son Hugh, who took the name of Percy. The present holder of the title is his descendant. The family hold also the title of earl of Beverley, created in 1790. *See* Northumberland, Earl and Duke of; consult also History of the House of Percy, G. Brenan, ed. W. A. Lindsay, 1902.

Percy, THOMAS (1729-1811). British prelate and man of letters. Born at Bridgnorth, the son of a



Thomas Percy,
British prelate
After Reynolds

grocer, April 13, 1729, he was educated at Christ Church, Oxford. Devoting himself to the study of old literatures, he published, in 1765, the famous *Reliques of Ancient English Poetry*. His translation of P. H. Mallet's *Northern Antiquities*, published in 1770, aroused a similar interest in old Norse records. Of Percy's original work the only piece that deserves to be remembered is the ballad, *O Nancy, wilt thou go with me?* Dean of Carlisle in 1778, and bishop of Dromore in 1782, he was an original member of Johnson's literary club, and died Sept. 30, 1811.

Percy Reliques.

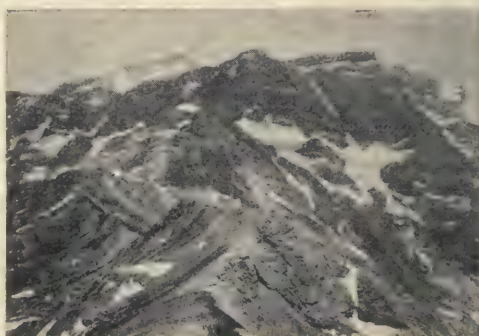
Old songs, ballads, and other pieces prepared by Thomas Percy, bishop of Dromore, and published in 1765 as *Reliques of Ancient English Poetry*. The foundation of his work was a folio MS. of about 200 poems, which had been compiled about the middle of the 17th century, and was found at Shifnal, Shropshire, but to the pieces selected from that folio, Percy added many gathered from other sources, and also some later poems. Though he freely adapted and expanded the poems which he published, his work marks an important stage in literary history, the starting point of the modern study of ancient poetry, and a powerful factor in the romantic revival. The folio MS. on which he primarily drew is now in the British Museum; the full text of it was published, 1867-68, by F. J. Furnivall and J. W. Hales.

Perdiccas (d. 321 B.C.). Distinguished general of Alexander the Great, whom he accompanied in his Persian campaigns. On the death of Alexander in 323 B.C. he became chief minister to his successor, Arrhidaeus. He embarked on a campaign against Ptolemy, the ruler of Egypt, but the campaign miscarried, and Perdiccas was put to death by his own soldiers.

Of three early kings of Macedonia of this name, the second played a part in the Peloponnesian war, first as an ally of Sparta, afterwards of Athens.

Pérdita. Character in Shakespeare's tragi-comedy *A Winter's Tale*. The daughter of Leontes and Hermione, king and queen of Sicily, she is exposed at birth by the orders of her father, who doubts her paternity, on a desolate shore in Bohemia, where she is found by an old shepherd and brought up as his daughter. Wooed by Florizel, son of Polixenes, king of Bohemia, she flees with him to Sicily, where she and her mother are reunited to Leontes. *See* Florizel.

Perdu, MONT. Peak in the Pyrenees. It is in the Spanish territory of Huesca, and lies S.E. from the Pic du Midi, its alt. being 10,994 ft. A glacier descends from the summit in three ridges. *See* Pyrenees



Mont Perdu, Spain. The mountain peak of the Pyrenees, from the north

Pereda, JOSÉ MARIA DE (1833-1906). Spanish author. He was born near Santander, Feb. 6, 1833, and began life as an engineer, turning to journalism and literature in 1858. *Escenas Montañesas* (Mountain Scenes), 1864, is typical of his method, and contains splendid word pictures of his province of Santander. Pedro Sanchez, 1883, is perhaps his best work of fiction. He died March 1, 1906.

Père David's Deer (*Cervus davidianus*). Chinese species of deer. It is so named because it was first noticed by the Père David in the emperor of China's park near

Peking Its chief character lies in its antlers, which fork early into two equal branches, of which only the front one divides. See Deer.

Peregrine Falcon (*Falco peregrinus*). Bird of prey formerly much used for the sport of hawking. A native of Britain, and found in most other parts of the world, it nests chiefly on sea-cliffs, and lays three or four mottled red-brown eggs. The young birds

migrate in autumn to other lands. Adult birds have the crown of the head and the moustaches bluish black, the back and upper parts bluish grey, and the lower parts pale salmon colour barred transversely with brown. The size is about that of the rook, the male or "tiercel" 15 ins. in length, and the female a fifth larger. It has a very rapid graceful flight. Its prey is chiefly the larger birds, including pigeons, grouse, and duck. See Eggs, col. plate; Falcon; Hawking.

Peregrine Pickle. Novel by Smollett, published in 1751, with the full title of *The Adventures of Peregrine Pickle*, in which are included *Memoirs of a Lady of Quality*. It is a broadly humorous narrative, following the adventures of the hero from his birth to his marriage, and introducing several notable characters, such as Commodore Truncheon and Lieut. Hatchways. The *Memoirs of a Lady of Quality*, which form the very lengthy 81st chapter, were written by Frances, Viscountess Vane (1713-88), who paid Smollett for their insertion in his story. See Smollett.

Perekop. Isthmus of S. Russia. It is about 20 m. long and 4 m. wide, and unites the Crimean Peninsula with the mainland.

Perekop. Town of S. Russia. The ancient Taphros, it is in the govt. of Taurida, 60 m. S.E. of Kherson, on the N. of the isthmus. It has lost its former importance since the construction of the Sevastopol railway, but some trade is done in salt, wool, and lamb-skins. In the 15th century Perekop formed part of the Tartar defences of the Crimea; it was captured by the Russians in 1783. It was prominent in the fighting between the counter-revolutionaries and the Bolsheviks, 1919-20. Pop. 6,000. See Russia; Wrangel, General.



Père David's Deer, a native of China

W. S. Berridge, F.Z.S.

Père-Lachaise. Cemetery of Paris. Situated in the N.E. of the city, in the Boulevard de Ménilmontant, it is the oldest and largest extra-mural cemetery of Paris, covering about 212 acres. The ground occupied by it formerly belonged to the Jesuits, and the cemetery received its name from Père François de La Chaise (*q.v.*), who was superior of the order in Paris. On the suppression of the order the ground was sold and passed through a number of hands, until in 1804 it was purchased by the municipality and converted into a cemetery.

The cemetery is celebrated by reason of the famous people buried there, and its noteworthy monuments. On the right of the principal entrance is the Jewish cemetery, where the tomb of Elisa Rachel (*q.v.*) is the most noted. A little farther to the right is the tomb of Abélard and Héloïse. In a prominent central position is the handsome monument of Casimir Périer. Other graves are those of Béranger, Balzac, La Fontaine, Molière, and Alfred de Musset among literary figures of France; Macdonald, Lefebvre, Masséna, Davoust, Ney, and Foy among soldiers. Many English persons are buried here, including Sir Sydney Smith. A fine chapel occupies the site of the former Maison de Mont Louis, headquarters of the Jesuits. There is also a Mussulman cemetery with a mosque. See Abélard; Bartholomé, P. A.; Cemetery; Paris.

Perennial. Plant that lives through a number of years. All trees and shrubs are perennial, so the term is restricted in its use to herbaceous plants, to distinguish the long-lived species from annuals and biennials. Perennial herbs with stems die down to the earth, as a rule, before winter, their vitality being preserved in root-stocks, bulbs, or tubers. Stemless

and creeping perennials, such as the primrose and white arabis, retain at least some of their leaves until the new leaves of spring are expanded. See Botany; Plant.

Pereyaslavl. Town of Central Russia. It is in the govt., and 70 m. N.W., of Vladimir, and stands where the river Trubezh flows into Lake Pleshcheyevo. Its chief industries are cotton-spinning, tanning, dyeing, and the making of tobacco. Pop. 9,000.

Pereyaslavl. Town of S.W. Russia. It is in the govt., and 140 m. N.W., of Poltava. Tobacco, bricks, boots and shoes, etc., are manufactured, and an important trade is done in cereals. It was in existence in 993, in 1054 was the capital of a principality, and is an historic town for the Ruthenes and Little Russians. Pop. 18,600.

Perez, ANTONIO (1539-1611). Spanish statesman. An illegitimate son of Gonzalo Perez, the king's secretary, he succeeded him in 1567 and retained his master's complete favour until 1578. In that year, with the king's full acquiescence, he instigated the murder of



Antonio Perez, Spanish statesman

Escobedo, secretary of Don John of Austria, governor of the Netherlands, and was repudiated by Philip when inquiry into the murder was pressed. An attempt by the king's agents to remove him to a prison of the Inquisition to prevent embarrassing disclosures was resented as an infringement of public rights, and Perez escaped into Aragon, where a popular movement in his favour led to drastic action by Philip. Perez, who had been sentenced to death in his absence, crossed the Pyrenees and organized an unsuccessful raid on Spanish territory. He died in Paris, Nov. 3, 1611. Pron. Pay-reth.

Perez de Ayala, RAMÓN. Spanish novelist and story writer. A native of the Asturias and strongly Castilian in feeling, the background of his work in fiction is derived from the central provinces of Spain. His *Prometeo* and *Belarmino y Apolonio* are regarded as being in the front rank of modern Spanish novels. The first named, with its companion poetic novels, *Luz de Domingo* (Sunday Sunlight) and *La Caída de los Limones* (The Fall of the House of Limón), have been translated by Alice P. Hubbard, with the poems done into English by Grace H. Conkling.

Perfect (Lat. *perfectus*, complete). Musical term used in several senses: (1) Of intervals, the normal unison, octave, fifth, and fourth are reckoned as perfect, instead of major, owing to the simplicity of their ratios of vibration and their lowness in the harmonic series. (2) A perfect cadence is one in which the dominant chord is followed by the tonic chord. (3) Triple time was considered perfect by the musical theorists of the Middle Ages, and was indicated by a circle.

Perfect. In grammar, a tense of the verb denoting an act completed in time just past or still continuing, or a state or condition brought about by a previous action. Originally, it was a special kind of present; in "I have come to see" the action is past, but is continued in its effects. In most of the old Indo-European languages the perfect was formed by reduplication and vowel-change. In the Teutonic languages reduplication is very rare, and most of the oldest verbs simply change the vowel (give, gave), while so-called weak verbs add to the base (love, love-d, from "do"). The pluperfect (Lat. *plus quam perfectum*, more than perfect) indicates that an action was completed before another past action.

Perfectionism. Doctrine which teaches that it is possible for the Christian by the grace of God to be kept entirely free from sin. Similarly, Buddhists teach that by meditation and mortification a devotee may be entirely set free from sin. As a mere theory, the perfectibility of Christians is a matter of opinion in the Christian Church. The early Methodists, and some sects at the present day, urge it as a practical matter which concerns all true Christians. The doctrine is based upon the various precepts of the N.T., which urge Christians to aim at perfection.

Perfectionists. American sect, founded by John Humphrey Noyes about 1845. He established a community of his followers at Oneida (q.v.) in 1848. He taught a form of perfectionism, according to which the members of the community were so established in holiness that they could neither fall into sin nor make any further spiritual progress. Whatever they did was good—a principle which introduced Antinomianism in its worst form. They practised community of wives as well as of goods, and had a system of "complex marriage" which was practically free love. They found it necessary in 1880 to abandon these communistic practices, and divided their

property among the members, who became shareholders in the Oneida Community, Ltd.

Performance. Something done, especially of a public character. It is used for an exhibition in a theatre or other place of amusement, and also for the carrying out of a contract or other piece of work. See Theatre.

Performance. In aeronautics, term used to cover the capacity of any aircraft as to speed, climbing power, carrying capacity, etc.

Perfume (Lat. *per*, through; *fumus*, smoke). Scent arising from a sweet-smelling substance. In Egypt, different kinds of perfumes were offered on the altar at dawn, noon, and evening. Purification was carried out by the

for Eastern perfumes, and especially for that prime favourite of Eastern perfumes, otto of roses. The principal other floral perfumes have their largest centres of preparation in Southern France and on the Riviera, where a large acreage is given up to the production of flowers for the purpose. At Cannes, the perfumes prepared are rose, tuberose, and jasmine; at Nice, violet; at Nîmes, thyme, rosemary, and lavender; at Grasse, various cosmetics. Orange water is made in Sicily; iris and bergamot in other Italian centres; and there is a flourishing industry at Algiers. The two perfumes produced on a large scale in England are mint and lavender.

There are really two branches in the manufacture of perfumes, usually carried on in different centres: perfumery proper, which is naturally carried on chiefly on the spot, as the plants must be fresh to give the best results; and the mixing of the essences secured with fat for pomades and other preparations, with alcohol for liquid scents, and with various other materials for toilet preparations. See Eau de Cologne.

Perga OR **PERGE.** Ancient city of Pamphylia, and a centre of the worship of Artemis. It is memorable as the place which S. Paul first visited on his missionary journeys. Its ruins lie about 10 m. N.E. of Adalia, Asia Minor.

Pergamino. Town of Argentina, in the prov. of Buenos Aires. It is an important rly. junction, 64 m. S. of Rosario and 140 m. N.W. of Buenos Aires. Pop. 6,000.

Pergamum OR **PERGAMUS.** Ancient city of Mysia, Asia Minor. The modern Bergama, it is situated about 20 m. from the sea, on the N. bank of the Caicus. It became a place of importance in the first half of the 3rd century B.C., a kingdom being established there by Philetaerus in 280 B.C. The kingdom reached the zenith of its power under Eumenes II in 190 B.C., who was tactful enough to identify himself with the all-conquering Romans, and received from them most of W. and central Asia Minor. It was under Eumenes II that the great library was founded, said to rival that of Alexandria. Eumenes also beautified the city with many fine buildings and sculptures. In 133 B.C. Attalus III, the last king, died, and by his will the kingdom passed to the Romans. Extensive excavations were made by the Prussian government, 1871-78. Among the fine buildings found is the great altar of Zeus, with colossal reliefs of the battle between the gods and giants, now



Pergamum. The Gaul and his Wife, a Pergamene bronze group representing a Gaulish warrior slaying his wife and himself to escape capture

Museo delle Terme, Rome

fumigation of temples and dwellings by the burning of scented substances. In their religious processions they burnt myrrh, cinnamon, iris, and other strong scented substances. Perfumes were pressed into the service of the dead, and the process of embalming was carried out with the costliest spices. The Hebrews took with them, from Egypt, the use of incense and other perfumes, and throughout Western Asia the use of perfumes was general for ceremonial and domestic purposes.

Perfume is obtained from the flowers, leaves, and in some cases the roots and the wood of plants by the extraction of the essential oil by maceration or by pressing, and in other cases by distillation in water or alcohol. Constantinople and Adrianople are great markets



Pergamum. 1. Gate of the Roman amphitheatre and, 2, part of the ruined interior. 3. Statue of the Dying Gaul, an example of the Pergamene school, now in the Capitoline Museum, Rome. 4. Restoration of the south wing of the great altar of Zeus

in Berlin. Another famous example of the statuary of the Pergamene school is the Dying Gaul, falsely called the Dying Gladiator, in the capitol at Rome.

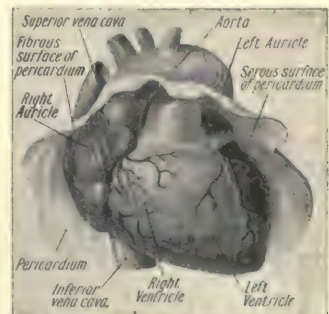
Pergola (Ital., arbour). Name given to a trellis erection spanning a garden walk, upon which

story of Paradise and the Peri—told in Thomas Moore's *Lalla Rookh*—relates how one peri secured admission into the abode of the blessed.

Periander (c. 665–585 B.C.). Tyrant of Corinth, 625–585 B.C., and one of the seven wise men of ancient Greece. Though at first his government was beneficent, he degenerated into an oppressive despot. Thrasybulus, tyrant of Miletus, consulted by him, is said to have taken the messenger through a cornfield, cutting off as he went the tallest ears of corn. Periander accordingly rid himself of the noble families of the city. He was a generous patron of art and literature, and founded several important colonies.

Pericarditis. Inflammation of the pericardium. It may occur in the course of Bright's disease, rheumatism, gout, or fevers, or may result from injury, or an extension of inflammation from the lungs, heart, or other organs. Suppurative pericarditis may occur in the course of septicemia and pyemia. The most marked symptoms are pain, increase of pulse rate, difficulty in breathing, and coughing. Acute pericarditis may terminate in complete recovery, in sudden death, or in chronic pericarditis with the formation of adhesions and dilatation of the heart.

Pericardium (Gr. *peri*, around; *kardia*, heart). Fibro-serous membrane which encloses the heart. The base of the pericardium is attached to the central part of the diaphragm or big horizontal muscle which separates the abdomen from the thorax, and the apex surrounds the commencement of the aorta or main blood-vessel of the body. Immediately in front of the pericardium is the middle piece of the sternum or breastbone, and the cartilages of the fourth to the seventh ribs on the left side. The pericardium contains in health a small amount of lymph, the function of which is to lubricate the two surfaces and thus facilitate the movements of the heart.



Pericardium. Diagram showing relative position of the pericardium to the heart



Pergola of stone and wood

flowers and creepers are trained. It was introduced from Italy. The best climbers for a pergola are vines, roses, honeysuckles, clematis, wistaria, aristolochia, and jasmine.

Peri. In Persian mythology, a fairy-like being of a race between angels and demons. They are harmless and beautiful, but are excluded from Paradise. The

Pericles (c. 499-429). Athenian statesman. Educated by Zeno of Elea and Anaxagoras, he made his appearance in public life in 469. Though an aristocrat by birth and breeding, Pericles, in conjunction with his colleague Ephialtes, about 463 B.C., procured the important reform restricting the powers of the aristocratic Areopagus (*q.v.*). The murder of Ephialtes in 461 B.C. left him without a rival in his own party. In 443 B.C. the ostracism or exile of the conservative leader Thucydides (who is not to be confused with the historian of that name) left him without a rival in the state, in which he continued supreme until his death.

Pericles regarded the state as existing in the interests of the whole, not of a class; he trusted in the people, in their intelligence and their moral instincts; but at bottom that trust rested upon his confidence in his power of leading them and inspiring them. The democracy he set up required a Pericles to lead and inspire it, to give it fixity of purpose and policy. He made Athens free, and he made her the first state in the Grecian world, but he did not give her the organization which might have fitted her to retain the position he won for her. The inheritor of the ideas of Themistocles (*q.v.*), he saw that the true policy for Athens was to establish her own naval supremacy, and her primacy in a league of maritime states; but her primacy was always in danger of being turned into a tyrannical dominion in the hands of lesser statesmen than himself.

His ideals are magnificently set forth in the famous funeral oration attributed to him by the historian Thucydides. He aimed at a leadership which should ultimately have welded the Greeks into a great free state made up of autonomous units. From that ideal he did not depart, and it was in the pursuit of it that the growing prestige of Athens spurred on Sparta and her other rivals to seek her overthrow. Pericles had anticipated the attack and accepted the challenge with a confident equanimity; but two years after the Peloponnesian war broke out in 431 B.C. his guiding hand was removed by death. The age of Pericles was the most brilliant in the history of Greece. See Greece; consult also *The Age of Pericles*, W. Watkiss Lloyd, 1875; *Pericles and the Golden Age of Athens*, Evelyn Abbott, 2nd ed. 1901. *Pron.* Peri-kleez.

Pericles, PRINCE OF TYRE. Romantic play attributed to Shakespeare. The greater part was

probably written by George Wilkins, Shakespeare's handiwork being seen chiefly in Acts 3-5. It



Pericles, Athenian statesman
From a bust in the British Museum

is based on adaptations by John Gower and Laurence Twine of the early Greek romance of Apollonius of Tyre. The play deals with the loss by Pericles of his wife and daughter and their reunion. First acted at The Globe in 1608, and popular as late as 1630, the last notable production in London was that by Phelps at Sadler's Wells, Oct. 14, 1854. Wilkins, in 1608, published a novel which he said was based on the play. Pericles was first printed in 1609, but not admitted to Shakespeare's collected works until the second issue of the Third Folio in 1664. It contains 2,386 lines, of which 418 are in prose and 1,436 in blank verse. See Shakespeare's Library, vol. 4, W. C. Hazlitt, 1875; *Handbook to Shakespeare's Works*, M. Luce, 1907.

Peridot. In geology, a variety of chrysolite. Found in N. America, the Levant, etc., and alternatively known as Job's tears, peridot is always some shade of green. It commonly appears in the form of small pebbles, and is used as a gem stone. See Chrysolite.

Peridotite. In geology, a name given to a group of crystalline igneous rocks. They consist chiefly of olivine, together with augite, biotite, hornblende, hypersthene, and magnetite, etc. Quartz and

felspar are absent, but the rocks are rich in magnesia, and for that reason are alternatively known as magnesian rocks. Peridotites are often rich in iron, and on decomposition pass into serpentine, most of which rock has been so formed. Corundum, platinum, red garnet, and diamonds are all found in peridotites. See Olivine; Serpentine.

Perigee (Gr. *peri*, around; *gē*, the earth). Point in the moon's orbit at which the moon approaches nearest to the earth. The term is sometimes applied to the position of any heavenly body when it approaches in its orbit nearest to the earth. It is the opposite point of apogee. See Apogee; Moon.

Périgord. One of the provinces into which France was divided before the Revolution. It is now represented by the depts. of Dordogne and Lot-et-Garonne. Before the 14th century it was feudatory to Aquitaine, and as such was an English possession. After the expulsion of the English it was united to the crown of France. *Pron.* Pay-rigór.

Périgueux. Town of France. The capital of the dept. of Dordogne, it stands on a height on the right bank of the Isle, about 80 m. E.N.E. of Bordeaux, and is a junction of the Orléans rly. It has locomotive works, and manufactures agricultural machinery, furniture, woollens, hats, etc. A considerable trade is carried on in wine. The cathedral of S. Front, 984-1047, built perhaps in imitation of S. Mark's at Venice, is a fine example of Byzantine architecture. Other important buildings are the church of S. Étienne and the prefecture. Périgueux, the ancient capital of the Gallic Petrocorii, was the Vesunna of the Romans, relics of whose rule remain in a great tower and an amphitheatre. It was besieged by the English in 1356, and was sacked by the Huguenots, who occupied it from 1575 to 1581. Pop. 33,500.



Périgueux, France. The cathedral of S. Front, seen from the east

Perihelion (Gr. *peri*, around; *helios*, the sun). In astronomy, the point in the orbit of a planet or comet at which it makes its nearest approach to the sun. It is opposite to aphelion, the farthest distance, the line joining the two points being known as the line of apsides. See Aphelion; Apsides.

Perim. Rocky island in the straits of Bab-el-Mandeb under British control. It commands the entrance to the Red Sea, and is situated 97 m. W. of Aden. It is about 5 sq. m. in area, and is a coaling depot for the mercantile marine. It was held by the British 1799-1800, occupied 1857, and is now administered as a dependency of Aden. See Bab-el-Mandeb.

Perimeter (Gr. *peri*, around; *metron*, measure). Line or lines bounding a closed geometrical figure, or any area or surface.

Perineum. That part of the body which forms the external floor of the pelvis (*q.v.*).

Period (Gr. *peri*, around; *hodos*, path). Word used in a number of senses. Historically, it indicates a cycle of years or events, *e.g.* the Louis XV period, the Commonwealth period, etc. In astronomy, it indicates a definite cycle, as the lunar period or Metonic cycle of 19 years. It is also used in astronomy for the time required for a celestial body to complete a revolution in its orbit, *e.g.* the earth's period is 365 days, etc. In mechanics the word is used for the interval of time between the recurrent phases of an oscillation or vibration, *e.g.* that of a pendulum or a tuning-fork. A periodicity is the regular recurrence of the same phenomena in the same times. A large number of movements in nature are periodic, *e.g.* movements of waves.

Periodic Law. In chemistry, a basis of classification of the elements. Chancourtois, in 1862, arranged the elements according to their atomic weights along a spiral line drawn round a cylinder. In 1864 Newlands noticed that when the elements are placed in order of their atomic weights, in seven horizontal series, each consisting of eight members, each set of elements thus placed possesses somewhat similar properties.

Mendeléev, in 1869, independently arrived at a periodic classification of the elements which he elaborated in considerable detail. This arrangement, brought up to date, is shown in the table. Blank spaces denote the position of elements which may yet be discovered. When Mendeléev drew up his table he predicted that other elements with certain properties would be discovered. These

conditions were fulfilled by gallium, discovered in 1875, scandium in 1879, germanium in 1887.

Perioeci (Gr. *perioikoi*, those who dwell around). Intermediate class in the Spartan state, descendants of the pre-Dorian population with an admixture of other elements. They were above the Helots (*q.v.*) or serfs, could farm their own land and engage in trade, but had not the political rights of the full Spartan citizens, though they were liable for military service. *Pron.* Perry-eessi.

between that of the annelids and the arthropods. It is believed to be related to the original progenitor of all the air-breathing Arthropoda. The cylindrical body is built up of soft rings, and has 17 pairs of short conical feet ending in a pair of hooked claws. The head bears a pair of antennae, two simple eyes, and a mouth provided with swollen lips and four horny jaws. Breathing is effected by means of short air tubes, which have their openings scattered irregularly over the whole surface. It has paired neph-

ELEMENTS ARRANGED ACCORDING TO THE PERIODIC LAW

	SHORT PERIODS			LONG PERIODS				
	1	2	1	2	3	4	5	
0	He. 4	Ne. 20.2	A. 39.88	Kr. 82.9	X. 130.2		Nt. 224.4	
I	Li. 6.94	Na. 23	K. 39.1 Cu. 63.57	Rb. 85.45 Ag. 107.88	Cs. 132.8	Au. 197.2		
II	Be. 9.1	Mg. 24.32	Ca. 40.07 Zn. 65.37	Sr. 87.63 Cd. 112.4	Ba. 137.37	Hg. 200.6	Ra. 226	
III	B. 11	Al. 27.1	Sc. 44.1 Ga. 69.9	Yt. 89.7 In. 114.8	La. 139	Yb. 173.5 Tl. 204		
IV	C. 12.005	Si. 28.3	Ti. 48.1 Ge. 72.5	Zr. 90.6 Sn. 118.7	Ce. 140.25	Pb. 207.2	Th. 232.4	
V	N. 14.01	P. 31.04	V. 51 As. 74.96	Cb. 93.1 Sb. 120.2	Pr. 140.92	Ta. 181.5 Bi. 208		
VI	O. 16	S. 32.06	Cr. 52 Se. 79.2	Mo. 96 Te. 127.5	Nd. 144.3	W. 184	U. 238.2	
VII	F. 19	Cl. 35.46	Mn. 54.93 Br. 79.92	I. 126.92				
VIII			Fe. 55.84 Ni. 58.68 Co. 58.97	Rh. 102.9 Ru. 101.7 Pd. 106.7		Os. 190.9 Ir. 193.1 Pt. 195.2		

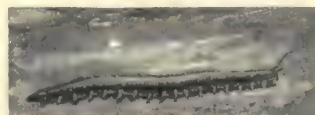
NOTE.—For explanation of symbols used see under Chemical Signs. Be is the symbol for Beryllium, U for Uranium

Periostitis (Gr. *peri*, around; *ostea*, bones). Inflammation of the periosteum or fibrous membrane which invests bones. Acute periostitis is most frequently the result of an injury. It may also develop from inflammation in the neighbourhood of the bone, as, for instance, periostitis of the jaw from a carious tooth. The symptoms are pain, and redness and swelling of the limb over the site of the inflammation.

Peripatetics (Gr. *peripatetikos*, walking about). Name given to the followers of Aristotle. They were so called either because their master and his successors were in the habit of delivering their lectures walking about in the Lyceum, or from its walks (*peripatoi*). The chief Peripatetics are Theophrastus, Eudemus, Aristoxenus, Strato, Andronicus of Rhodes, and Alexander of Aphrodisias.

Peripatus. Caterpillar-like animal about three inches in length, whose organization is intermediate

ridia in each of its segments after the first two, a central nervous system, and a main vascular trunk or heart. Originally it was classed as a slug, owing to its copious ejection of a viscid fluid, which, however, appears to serve for the capture of insects; later, some of the structural features caused it to be regarded as a worm. It has since been put in a class (*Onychophora*) by itself. The young are produced alive. About 50 species are known, which have been found in S. Africa, S. America, the W. Indies, and New Zealand.



Peripatus, the caterpillar-like animal of the class Onychophora

Periscope (Gr. *peri*, around; *skopein*, to watch). Apparatus for observing from a concealed



Periscope. Instrument invented by H. A. Silver, of Cincinnati, U.S.A., constructed on the principles of a periscope, for showing on a screen to students of surgery an operation being performed in an adjoining room. Right, diagrams illustrating submarine, Fig. 1, and field, Fig. 2, periscopes. In each the picture enters at A, is reflected down by prism B to prism C, thence to eye-piece D. In submarine instruments: E is valve to shut out water if periscope is shot away; F, wheel to rotate instrument

position or enabling an observer to see over obstructions. It consists usually of reflecting mirrors or prisms fixed in a tube, one set of mirrors reflecting the object down the tube and the other to the eye of the observer. The submarine periscope has additional lenses in the tube itself and a special eyepiece. The trench or field periscope, extensively used in the Great War, consisted of two mirrors fixed at the ends of a collapsible framework. See *Camera Obscura*; *Submarine*.

Peristalsis (Gr. *peri*, around; *stalsis*, compression). Rhythmic contractions which travel like waves along muscular fibres, exhibited only by involuntary muscles. Peristalsis of the intestine plays an important part in mixing

the contents with the digestive juices and forcing the material along the canal. The movements of the heart are a more complicated form of peristalsis.

Peritoneum (Gr. *periteinein*, to stretch around). Serous membrane which lines the walls of the abdominal cavity and is reflected over the internal organs, so as to cover them more or less completely. The part lining the cavity is known as the parietal layer, and that covering the organs as the visceral layer. Folds of the peritoneum which are connected with the stomach are known as omenta. The largest of these connects the stomach with the transverse colon, and is known as the greater omentum. The term mesentery is applied to any fold of the peritoneum which attaches the intestine to the posterior wall of the abdomen. Reflections of the peritoneum from the abdominal walls on to viscera other than the intestine are called ligaments. The function of the peritoneum is to facilitate the peristaltic movements of the intestine.

Peritonitis. Inflammation of the peritoneum. It results from injury of the membrane or extension of disease from one of the abdominal organs. Hence it may arise from appendicitis, obstruction or ulceration of the bowel,

strangulated hernia, cancer, etc. Most often the infecting organism is the *Bacillus coli*, which is normally present in the intestine, and, when the walls of that canal are injured or diseased, is able to make its way through to the peritoneum. Tubercular peritonitis is another form which is not uncommon in children. Peritonitis may be general, affecting a large extent of the membrane, or local, i.e. limited to the neighbourhood of an inflamed organ, and it may be either acute or chronic.

The symptoms of acute peritonitis are severe and continuous pain in the abdomen, often with a rise of temperature.

Vomiting is a marked symptom.

In acute cases a fatal termination may occur within a

few hours. Where perforation of the bowel is suspected, operative treatment is the only hope, and similar treatment is nearly always advisable where appendicitis

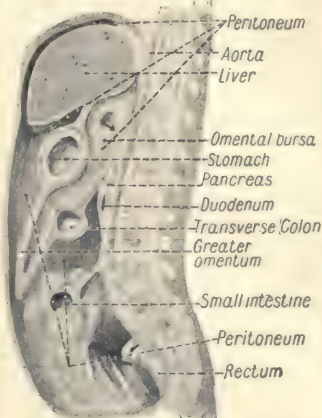
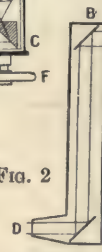
is believed to be the cause of the symptoms. Chronic localised peritonitis may be treated with plasters and iodine, and if adhesions have formed between two contiguous surfaces of the peritoneum, operative treatment may be indicated.

Perivale or **GREENFORD PARVA.** Hamlet of Middlesex, England. It is on the N. bank of the Brent, between Castlebar Hill, W. Ealing, and Greenford Green, covers 626 acres, mostly farm land, and in early times was famous for its wheat. The first lord of the manor was Geoffrey de Mandeville. The tiny church, partly Early English in style, is said to have been founded



FIG. 1

FIG. 2



Peritoneum. Diagram showing the general relation of the peritoneum to the adjacent organs



Perivale, Middlesex. The wooden bridge over the Brent with the tiny, tree-enshrined parish church on the river bank

in the 12th century, but seems mainly to belong to the 14th. It was restored in 1875. It has a wooden western tower. The hamlet is referred to in old records as Cornhull or Cornhill. See The Chronicles of Greenford Parva, J. A. Brown.

Periwig. Word derived from the French *perruque*, meaning an artificial head of hair. It is usually shortened to wig (*q.v.*).

Periwinkle (*Littorina littorea*). Marine snail with thick stony shell. It is abundant on all parts of the British coasts, whence thousands of tons are annually sent to inland towns for food. The mollusc has a distinct muzzle extended in front of a pair of tentacles or antennae, at the base of which are the eyes. Its principal food is marine algae, which is rasped by the very efficient tooth ribbon. Periwinkles, or winkles, are found at low-water mark in all parts of the world.

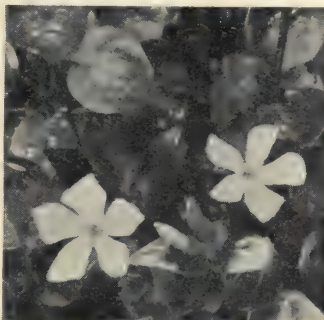
Periwinkle (*Vinca minor*). Perennial herb of the natural order Apocynaceae. It is a native of Europe and W. Asia. It has tough trailing stems about two ft. long, which root from the base of the paired oval varnished leaves. The blue-purple, salver-shaped flowers are borne singly, chiefly on shorter erect stems. The style expands above into the broad stigma which almost closes the mouth of the tube. The Greater Periwinkle (*V. major*), familiar in gardens, is similar, but larger in all its parts. It is a native of Europe and N. Africa. See Flower.

Periyar. River of Travancore, India. It rises in the Sivagiri Hills and flows N.W. and W. to the Arabian Sea. The upper waters of the Periyar have been diverted to the valley of the Vaigai for irrigation purposes. A dam, 176 ft. high, has made a reservoir of 8,000 acres, whence the water is led through a mile-long tunnel to the Suruli Valley and thence to the Vaigai.

Perizzites or **PHEREZITES** (perhaps villagers). One of the early peoples of Palestine. The name occurs in late insertions in the Hexateuch. They may be Canaanite cultivators.

Perjury. Wilfully swearing falsely in a judicial proceeding after having taken a lawful oath, administered by someone having authority to administer it, on a matter material to the issue. A mere slip of the tongue, or a hasty or exaggerated expression, will not amount to perjury. The statement need not be known to be false, if a person who knows nothing of the matter takes it upon himself to swear that it is true

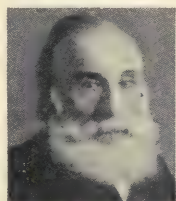
when it is not true. The statement must be positive; and as a rule "I believe," or "to the best of my knowledge" will protect the deponent; though it will not protect him if it is shown that he knew it was not true. The matter sworn



Periwinkle. Single flowers and glossy leaves of the Lesser Periwinkle, *Vinca minor*

to must be, in some way, material to a point at issue—e.g. the actual subject matter of the trial, or the damages, or the credibility of the witness. Perjury is a misdemeanour, and so is subornation of perjury, i.e. procuring another to commit perjury. Both are punishable by fine, imprisonment, or penal servitude. See Oath.

Perkin, SIR WILLIAM HENRY (1838–1907). British chemist. He was born in London, March 12,



Sir W. H. Perkin, British chemist

1838, and educated at the City of London School and the Royal College of Chemistry. In 1856, while endeavouring to prepare quinine synthetically, he obtained a beautiful mauve dye or Perkin's purple, so founding the aniline dye industry. Perkin devised a process for making the dye-stuff alizarin from anthracene, and invented several other important aniline dyes. He was the first to prepare the perfume coumarin synthetically. He retired in 1873. The rest of his life he devoted to physical and chemical researches. Knighted in 1906, he received the Davy medal of the Royal Society, and died July 14, 1907. See Dyes; Greenford.

Perks, SIR ROBERT WILLIAM (b. 1849). British contractor. Born April 24, 1849, the son of a Wesleyan minister, he was educated at the Wesleyan school, Kingswood, Bath, and at King's College, London. Becoming a solicitor, he

entered into partnership with Sir H. H. Fowler, afterwards Lord Wolverhampton. He became associated with a firm of contractors, C. H. Walker & Co., and had a



Sir Robert Perks, British contractor

share in building docks at Barry, Rio de Janeiro, and Buenos Aires, and the Transandinian Rly. In 1912 he left the firm of Walker and became interested in that of Macarthur, Perks & Co., which was responsible also for large contracts in both N. and S. America. He was one of the promoters of the Georgian Bay canal (*q.v.*). Perks was Liberal M.P. for the Louth division of Lincolnshire, 1892–1910. In 1898 he inaugurated the 20th century fund for raising a million guineas for the Wesleyan church. From 1902–6 he was chairman of the Metropolitan District Rly.; in 1908 he was made a baronet.

Perleberg. Town of Prussia. It stands on the Stepenitz, 6 m. from Wittenberge in the prov. of Brandenburg. The town hall dates from the 15th century. Industries include the making of machinery and soap. Pop. 9,000.

Perley, SIR GEORGE HALSEY (b. 1857). Canadian politician. Born at Lebanon, New Hampshire, Sept. 12, 1857, he was educated at Ottawa and Harvard. In 1904 he was returned to the Dominion House of Commons as Conservative member for Argenteuil. In 1911, he joined the Conservative ministry as minister without portfolio, and in June, 1914, was sent to London to succeed Lord Strathcona, temporarily, as high commissioner. As the Great War broke out soon after his arrival in London he remained there throughout, becoming minister of Overseas Militia, 1916. In 1914 he was knighted, and in 1917 became officially high commissioner, resigning in 1922.



Sir George Perley, Canadian politician

Perlis. Most northerly of the non-federated States, British Malaya. British suzerainty rests upon the treaty of 1909 when all the rights of Siam were transferred. It adjoins Kedah on the S.E., has a coastline of 25 m. on the W., and is elsewhere bounded by Siam. It

includes the island of Langkawi. Rice, rubber, and coconut are cultivated, and tin is mined. The state is traversed by the N. section of the main W. rly. from Singapore to Siam. Kangar, on the river Perlis, is the chief town. The area is 316 sq. m. Pop. 33,000.

Perlite. In geology, name given to an igneous rock of perlitic structure. Glassy of texture, the rock easily breaks up into small rounded masses that have a pearly lustre and give it its alternative name of pearlstone. See Hyalite.

Perlitic Structure. In geology, name given to the presence in volcanic rocks of small concentric fissures or cracks. These cracks form planes of decomposition, breaking the rocks up into round fragments like pearls giving the structure its name.

Perm. Government of Russia, partly in Europe and partly in Asia. Its area is about 127,500 sq. m., and it is divided into two parts by the Ural Mountains. It is a great mining area, gold, silver, copper, lead, iron, platinum, and coal being found here. Most of the area is heavily forested. Pop. 4,000,000.

Perm. Town of Russia, capital of the govt. of the same name. It stands on the Kama and the Perm-Tyumen Rly. The chief industries are tanning, distilling, and the making of bricks, candles, matches, and machinery. There is a busy trade in silk and cotton stuffs, tea, leather, sugar, and furs. Perm owes its prosperity to the copper mines discovered in the 17th century. In Dec., 1918, Koltchak (*q.v.*) captured it from the Bolsheviks. Pop. 105,000.

Permanganates. Salts of permanganic acid. The best known is potassium permanganate, a purple-coloured substance used in solution as a disinfecting agent, and also as an oxidising agent in analytical chemistry. The acid is unknown in the pure state, but exists as a crimson, strongly acid solution. Its chemical formula is HMnO_4 .

Permian. In geology, name given by Sir R. Murchison to the rocks overlying the coal measures. So called from their occurrence in Perm, Russia, in which country they cover a very large area, they consist largely of sandstones and shales, and reach a thickness of over 4,000 ft. in some strata. The Permian rocks were at one time reckoned as a division of the Triassic, and they are found over large areas of Europe, N. America, in Africa, Australia, and Asia.

In Germany the Permian rocks are known as the Dyas from their two natural subdivisions, the red

sandstones, breccias, marls, and volcanic rocks, and the fossiliferous limestones, dolomites, and marls. In Scotland, Permian rocks are found in Ayrshire, Dumfriesshire, Nithsdale, etc., as red sandstones; similar red sandstones occur in the English Permian from Newcastle to Birmingham; in N. America, in the Appalachian area, in Missouri, Kansas, Nebraska, etc. Permian sandstones and shales are 1,000 to 5,000 ft. thick. They are sources of immense deposits of rock salt in Kansas in America, and Sperrberg in Germany.

The Permian rocks supply a fine quality of building stone, the magnesian limestone of the N.E. of England being particularly notable. In Kansas there are important deposits of gypsum, as well as in England and Germany. The rock salt and gypsum deposits indicate immense salt-water lakes existing in Permian times, paralleled by the Great Salt Lake of N. America of the present age.

Permian rocks are rich in fossils, including the proterosaur, platysomus, palaeoniscus, the shells of many mollusca, corals, etc., tree ferns, and many other varieties of plants. See Carboniferous System.

Permo-Carboniferous. In geology, term used for the border line rocks of the Permian and Carboniferous series. The term post-carbon has been used for such strata. See Carboniferous; Permian.

Permutation. Interchange or transmutation. In mathematics, the different orders in which things can be arranged are called their permutations. Thus the permutations of the letters *a, b, c*, taken two together, are *ab, ba, ac, ca, bc, cb*. It will be noticed that the order in which the things are placed is important, i.e. *ab* is different from *ba*.

The combinations of things are the different collections that can be formed out of them, neglecting the order in which the things are placed. Thus the combinations of *a, b, c*, taken two together, are *ab, ac, bc*; for *ab* and *ba*, though different permutations, form the same combination. The theories of permutations and combinations are important in the calculations of algebraic and other series, in the theory of probability, and in statistical work.

Pernambuco. Maritime state of N.E. Brazil. Situated S. of Parahyba and N. of Alagoas, it is well forested, fertile, and thickly peopled. There are plantations of cotton, sugar, coffee, cocoa, and rice; tobacco, cereals, and fruits are also cultivated. The chief exports include timber, dye-woods, drugs, rubber, and gold. The E. part of the state is served by rlys. The river São Francisco flows along part of the S. boundary, and many small rivers water the state. Its area is 49,573 sq. m. Pop. 2,000,000. *Pron.* Pairnumbooko.

Pernambuco OR RECIFE. Sea-port and town of Brazil, capital of the state of Pernambuco. It stands on the Atlantic coast, 380 m. N.E. of Bahia, and is a terminus of rly. lines running to the N., S., and interior, besides being the nearest



Pernambuco, Brazil. The old town of Recife, with the anchorage, from São Antonio; top, the cathedral, situated in Boa Vista

S. American port to Europe. The third city of importance in Brazil, it comprises three quarters: (1) the old settlement of Recife, still the chief commercial centre, founded in 1504 and occupied by the Dutch from 1630-54; it is situated on a sandy peninsula, and connected with the mainland by bridges; (2) São Antonio, on the island of São Antonio, formed by

the rivers Biberibe and Capibe-
rbe; (3) Boa Vista, on the main-
land, the residential section. Per-
nambuco has some of the finest
churches and public buildings in
Brazil. The harbour, which is
being enlarged, is a port of call for
numerous liners. It is a cable
station, and there is a wireless tele-
graph post at Olinda, in the
vicinity. Called the Venice of
America on account of its many
waterways, it exports sugar, cotton,
rum, coffee, cocoa, hides, rubber,
and dye-woods. Pop. 180,000.

Pernov OR **PERNAU**. Port of
Esthonia. It stands on the bay of
the same name, an arm of the Gulf
of Riga, at the mouth of the Per-
nava. It is a rly. terminus and has
rly. connexions with Riga, Pskov,
and Petrograd, and a trade in
grain, flax, hemp, and leather.
Founded in 1255, it became Russian
in 1710. Pop. 20,000.

Peroneus. Name of three
muscles of the leg. The *P. longus*
arises from the outer side of the
upper part of the tibia and the
upper two-thirds of the fibula. Its
tendon passes down the leg and
winds round the external malleolus
(the prominence on the outer side
of the ankle), and is inserted into
the first metatarsal bone of the
foot and the adjoining bone of the
ankle. The *P. brevis* arises from
the lower two-thirds of the outer sur-
face of the fibula. Its tendon
passes down behind the external
malleolus, and is inserted into the
fifth metatarsal bone. The action
of the *P. longus* and *brevis* is
to evert or draw up the outer side
of the foot, and to extend or straighten
the foot. The *P. tertius* arises from
the lower anterior part of the fibula,
and is inserted into the fifth meta-
tarsal bone. See Leg.

Péronne. Town of France. In
the dept. of Somme, it stands
on the right bank of that river,
94 m. from Paris and 35 from
Amiens. The chief building is the
church of S. Jean, dating from the
16th century, and there are the
ruins of a castle. Péronne was for-
merly the capital of Santerre, and
was afterwards in Vermandois. A
fortified town, in 1465 it was sur-
rendered to Charles the Bold, and
it was in the castle here, described
in Quentin Durward, that he kept
Louis XI of France a prisoner.
Wellington took Péronne in 1815,
and in Jan., 1871, it was bom-
barded and entered by the Ger-
mans. During the Great War the
Germans occupied the town, Sept.
24, 1914, and held it until it was
recovered by the British, Mar. 18,
1917. The Germans regained it
Mar. 24, 1918, but on Sept. 1, 1918,
it was entered by the Australians,

who had captured Mont St. Quentin
(q.v.), the height by which it
was protected. The town was
practically ruined by the Germans,
who started great fires and ex-
ploded mines on their withdrawal
in 1917. The Grande Place was
wrecked, and the historic town hall
reduced to ruins. With Maricourt,
Péronne has been "adopted" by
Blackburn. Pop. 4,700.

Perovskite. In mineralogy,
name given to calcium titanate,
CaTiO₃. Pale yellow to brown in
colour, with a metallic lustre, the
mineral is found in the Urals,
Switzerland, etc.

Perpendicular (Lat. *perpen-
diculum*, a plummet). Term used
for something exactly upright. In



Péronne, France. The Grande Place, before the destruction of the town in the
Great War. Left, the town hall; right, tower of the church of S. Jean. Inset,
entrance to the citadel

geometry, it is used to indicate a
line which is at right angles to a
given line or surface.

In architecture, the Perpendicu-
lar period refers to the phase of
Gothic architecture which began
towards the end of the 14th century
and lasted till the Renaissance,
about 1560. It was peculiar to
England, and its principal charac-
teristic was verticality. Even the
window tracery consisted of verti-
cal members, the mullions being
carried straight up through the
head of the window, which was in
its turn much larger than its pre-
decessors of the Decorated or Early
English styles. Arches consisted
either of two arcs or four, the latter

being known as four-centred;
columns were composite or clus-
tered, with small capitals, gener-
ally moulded; roofs were of the
hammer beam type, at first heavier
than before. The Perpendicular
period witnessed a great increase
in the use of panelling, an enhanced
richness in the decoration of the
choir-stall, and the perfection of
fan tracery vaulting.

The western part of the nave
of Westminster Abbey is Perpen-
dicular architecture at its best;
one may cite also Henry VII's
Chapel at Westminster, S. George's
Chapel, Windsor, and the choir of
Gloucester Cathedral. The period
produced some very fine domestic
buildings. See Arch; Architecture;
Bath; Gothic Architecture; Il-
minster.

Perpetual Motion. Action of
an imaginary machine which, once
being set in motion, continues for
ever without further impetus, un-
less stopped by some external
force. Such a machine is incon-

ceivable, since by the law of the
conservation of energy it is not
possible to do work without the
expenditure of energy in some
form. Many attempts have been
made to produce perpetual motion
machines, but none has been suc-
cessful. Those which have been
apparently successful have de-
pended upon the forces of nature,
e.g. a water wheel at Niagara.
See Energy; Motion.

Perpetuating Testimony.
Term used in English law. By the
statute 5 and 6 Victoria cap. 60,
any person who has a contingent
right or claim to any honour, title,
office, or real or personal property,
which right or claim will only arise

in the future, may bring an action to take the evidence of persons who are able to testify to the truth of his right or claim, and who might, and probably would, be dead before the event happened, or the time arrived when the claim would mature. On similar lines, when a witness in a criminal case is dangerously ill, his evidence may be taken by a magistrate (e.g. in hospital) in the presence of the accused, and if the witness dies, his deposition may be read at the trial.

Perpetuity. Legal term for a condition rendering an estate inalienable for ever, or for a very long time. This is especially repugnant to English law, which will not allow a man so to settle, or leave by will, his property as to tie it up for ever. Property can only be tied up in this way during a life or lives in being, and for 21 years after.

The rule against perpetuities was established long ago by the judges on public grounds, as destructive to the commonwealth and an impediment to commerce. See Entail; Thellusson, Peter.

Perpignan. Town of France. The capital of the dept. of the Pyrénées Orientales, it stands on the right bank of the Têt, about 40 m. S.S.W. of Narbonne. On a height overlooking the town is the citadel which encloses the old castle of the counts of Roussillon. The most important buildings are the cathedral of S. Jean, founded by Sancho II, king of Majorca, 1324, the loge, now occupied by the Mairie, and the old university, containing a public library and a museum. Trade is carried on in wine, wool, cloth, and cork-bark. In the Middle Ages Perpignan was the capital of the county of Roussillon, and belonged to Aragon from 1172 to 1475. The French conquered it in 1642. It was permanently united to France in 1659. Pop. 40,000.



Perpignan, France. The citadel and keep, part of the old castle of the counts of Roussillon

Perranzabuloe (Lat. *Pirani in sabulo*, of Piran in the sand). Parish and village of Cornwall, England. It is 5½ m. N. by W. of Truro. The church of S. Piran, a rude stone oratory, built by S. Kieran or Piran of Clonmacnoise, about 550, was discovered in 1835, having been buried in the shifting sand for 1,200 years; the carved work has been removed to the museum at Truro. Pop. (parish) 2,400. *Pron.* Perranzabbulo.

Perrault, CHARLES (1628-1703). French author. Born in Paris, Jan. 12, 1628, and educated at the



Charles Perrault, French author

Collège de Beauvais, he followed his father's profession, the law, became secretary to Colbert, and signalled his admission to the Academy in 1671 by a long poem, *Le Siècle de Louis XIV.*, which precipitated a six years' dispute with Boileau on the respective merits of the ancients and the moderns. He wrote memoirs and other works, but his fame rests on a series of fairy tales, which he made his own by the delightful style in which they were written. They include *Puss in Boots*, *Little Red Riding Hood*, *Cinderella*, *The Sleeping Beauty*, etc. Issued in volume form, 1697, as *Histoires ou Contes du Temps Passé*, by Perron Darmanecour, they achieved immense popularity and had many imitators. Perrault died May 16, 1703. In 1910 the French government erected to his memory, in the Jardin des Tuileries, Paris, a monument by G. Pech. See editions by Lefevre, 1875; P. Lacroix, 1876; A. Lang, 1888.

Perrier. Mineral spring of France. Near the village of Vergèze, in the dept. of Gard, it is 10 m. from Nîmes. The spring was discovered by the Romans, and a Roman well is still in existence.

Perrin, ALICE (b. 1867). British novelist. Daughter of General J. I. Robinson, she married Charles Perrin, spent several years in India, and became widely known as a novelist of Anglo-Indian life. Her portraits show

interesting observation of this society, and her novels have a good sense of construction. Among them



Alice Perrin, British novelist
Russell

and *The Vow of Silence*, 1920.

Perrot, GEORGES (1832-1914). French archaeologist. Born at Villeneuve St. Georges, Seine-et-Oise, Nov. 12, 1832, he studied in Paris. He proceeded to Athens in 1855, and in 1861, in company with the architect E. Guillaume, made archaeological explorations in Asia Minor, including Ancyra and several Galatian and Hittite sites. After holding several tutorial appointments, he occupied the chair of classical archaeology in Paris, 1875, and in 1904 became perpetual secretary to the Academy of Inscriptions. His outstanding work, written in collaboration with the architect Charles Chipiez, is a *History of Art in Antiquity*, in ten volumes, 1882-1914, Eng. trans. (part), 1883-9. He died in Paris, June 30, 1914.

Perrot, SIR JOHN (c. 1527-92). English courtier. Born in Pembroke, Shropshire, the supposed natural son of Henry VIII, he came to London in his 18th year, and attracted the attention of the king, who promised him preferment. After the death of Henry, he was made a knight of the Bath by Edward VI, and accompanied a mission to France to arrange the young king's marriage. Under Mary, Perrot was imprisoned for his religious views, but, reinstated by Elizabeth, he became first president of Munster in 1570. Landing in March, he quickly suppressed the rebellion of Fitzmaurice Fitzgerald, returning to England, 1573, to defend himself against his enemies. He was lord deputy of Ireland from 1584 until 1588. His trial for treason, four years later, resulted in the death sentence June 26, 1592, but he died in the Tower before it could be carried out, Sept., 1592. See Life, ed. R. Rawlinson, 1728.



Sir John Perrot, English courtier

Perry (Old Fr. *peré*, from Lat. *pirum*, a pear). Alcoholic liquor obtained from fermented pear-juice. It is largely made in France, especially in Normandy and Brittany, and in England, in the counties of Worcester, Gloucester, Hereford, Devon, and Somerset. Made in a similar way to cider (*q.v.*), it is a fine, pale-coloured, sweet and aromatic beverage, containing from 5 to 9 p.c. of alcohol.

Perry, JOHN (1850–1920). British scientist. Born Feb. 14, 1850, he was educated at Queen's College,



John Perry,
British scientist
Elliott & Fry

Belfast. He was professor of engineering in Japan, 1875–79, and in the latter year became a consulting electrical engineer. With Professor Ayrton he invented many electrical in-

struments. He was professor of engineering and mathematics at the City and Guilds of London Technical College, Finsbury, 1881–96, and professor of mathematics and mechanics at the Royal College of Science, S. Kensington, 1896–1914. He died Aug. 4, 1920. His numerous publications include *The Steam Engine*, 1874; *Spinning Tops*, 1890; and *Applied Mechanics*, 1897.

Persano, CARLO DI PELLION (1806–83). Italian sailor. Born at Vercelli, March 11, 1806, he entered the Piedmontese navy and rapidly rose to flag rank. He distinguished himself at the sieges of Messina, Gaeta, and Ancona, 1860–61, and in 1862 became minister of marine. In supreme naval command in the war against Austria, 1866, he was defeated at the battle of Lissa, and although not solely to blame for the disaster, was made the scapegoat and degraded. He died July 28, 1883.

Perseid Meteors. System of meteors, which have their radiant point in the constellation of Perseus. The shower appears in August and lasts two to three weeks. It was first recorded in the 6th century. The shower follows the same path as Tuttle's comet, (*q.v.*) and has been calculated to have a width of 30,000,000 m.

Persephonē OR PROSERPINE. In Greek mythology, daughter of Zeus and Demeter, the goddess of agriculture. She was carried off while gathering flowers, by Pluto, the god of the underworld. The story of Demeter's search for her lost daughter is told under the entry Demeter. Persephonē was

allowed to spend six months of the year in the underworld, and six months with her mother. The rape of Persephonē is symbolical of the process of agriculture, her abduction to the underworld representing the sowing of the seed, and her return to her mother the growth of the corn. As the wife of Pluto, Persephonē was queen of Hades. See Demeter. *Pron.* Per-seffonee.



Persephonē, on her return from the underworld, in charge of Hermes, meets her mother, Demeter. From the painting by Lord Leighton, P.R.A.

By permission of the Corporation of Leeds

Persepolis (Gr., city of the Persians). Capital of the ancient Persian empire after Pasargadae. It was situated in the valley of the Medus or Murghab, near the Carmanian desert, 35 m. N.E. of the modern Shiraz. The vast ruins attest the magnificence of its architecture. The palaces and other public buildings are built on a terrace of masonry some miles from the city proper, and were approached by splendid stairways. The great hall alone covered 2½ acres. Persepolis was founded, according to some accounts, by Cyrus the Great, according to others by Cambyses. It was taken by Alexander the Great in 331 B.C., and the story goes that the burning of the palace of Xerxes was the act of Alexander himself, who in a drunken frolic, instigated by the courtesan Thaïs, applied the fire with his own hand. See Persia.

Perse School. English public school. Its foundation dates from 1615, under the terms of the will of

Stephen Perse (1548–1615), of Cambridge, which provided, among other objects, for the building of a free grammar school for the benefit of the town of Cambridge. It was erected soon after his death in what was then known as Free School Lane, behind Corpus Christi College. About 1842 new buildings were erected, and in 1873 a school for girls was established under the

Perse foundation. In 1888 the school was removed to a more convenient site on the Hills Road, the old site and buildings being purchased by the university. Part of the original structure is still preserved. A Great War memorial was unveiled at the school in 1921.

Perseus. In Greek legend, son of Zeus and Danaë, daughter of Acrisius, king of Argos. Polydectes, king of Seriphus, wishing to marry Danaë, was desirous of getting rid of Perseus, and sent him to Libya to secure the head of Medusa, the Gorgon. With the help of Athena, Perseus succeeded in his task, and on his return journey passed through Ethiopia, where he saved Andromeda (*q.v.*) from the sea-monster, and made her his wife. Reaching Seriphus, and finding that Polydectes had been treating his mother unkindly in his absence, he turned the king and his whole court into stone by showing them the Gorgon's head.

He subsequently presented the head to Athena. Perseus now returned to his original home at Argos, to see his grandfather, Acrisius, taking with him Danaë and Andromeda. Following him, in disguise, to Larissa, he accidentally killed him there with a quoit. Perseus became king of Argos, and subsequently exchanged it for Tiryns; he is also regarded as the founder of Mycenae. See Cellini, B.; Danaë; Gorgon. *Pron.* Pers-yewes.

Perseus. In astronomy, a N. constellation extending from Cassiopeia to Taurus. It is traversed by the Milky Way, and contains the well-known variable star

Algol or Beta Persei. The constellation also contains a number of other variables and many double stars. On Feb. 22, 1901, a new star suddenly appeared in the constellation, and after a short existence faded to a telescopic object. Perseus is notable for two fine star clusters, N.G.C. 1039 and h Persei.

Perseverance. Term used in Christian theology to denote the persistency of the Christian life in the believer. The doctrine of the final perseverance of the saints is one of the characteristic features of the theological systems of S. Augustine and Calvin. It is impossible, according to this principle, for the true Christian ever to relapse from the faith. According to the teaching of Calvin, as formulated by the synod of Dort, "of this preservation of the elect to salvation and of their perseverance in the faith, true believers do and may obtain assurance whereby they arrive at the certain persuasion that they ever will continue true and living members of the Church."

This belief is the natural corollary of the doctrine of predestination, as set forth by Calvin. If the Christian is a man who has been predestined by God to eternal life, then it is, of course, impossible for him to lose his predestined reward. The doctrine of final perseverance was rejected by the Arminians. John Wesley wrote a tract in which he sought to prove that this belief was not in accord with the teaching of Scripture. He shows that Hebrews vi, 4-6, definitely points the possibility of relapse, as also does 2 Peter ii, 20-21, and that other N.T. passages only promise conditional security, e.g. John xv, 1-6, Romans xi, 20-22. See Calvinism; Grace.

Pershing, JOHN JOSEPH (b. 1860). American soldier. Of Alsatian descent, he was born in Missouri, Sept. 13, 1860. Graduating from West Point in 1886, he entered the U.S. army as a lieutenant of the 6th cavalry regiment, seeing service against the Apache and Sioux Indians during the next three years. In 1897 he was appointed instructor in tactics at West Point, and in 1898, having resigned his post, took part in the Spanish-American War, particularly in the fighting around Santiago. Next he organized the bureau of insular affairs, war department, Washington. In 1899 he was sent to the Philippines, and with the rank of general had charge of the expedition against the Moros of Mindanao in 1902. Appointed military attaché at Tokyo, he was in Manchuria with Kuroki's army during the Russo-Japanese War in 1905.



John Pershing, American soldier
Russell

After serving again in the Philippines, he was placed in command of the El Paso patrol on the Mexican border, and in 1916 led the punitive expedition sent into Mexico in pursuit of Villa. On the entry of the U.S.A. into the Great War he was made commander-in-chief of the American expeditionary force,

May 18, 1917, with the rank of lieutenant-general, and was in France in the following June at the head of a division. He remained commander-in-chief of the American forces on the W. front throughout the war. He was awarded the G.C.B. in 1918, and received the freedom of the city of London in 1919. He was promoted full general in the latter year, and in 1921 succeeded Peyton March (q.v.) as chief of the staff. On Oct. 17 of that year he laid the Congressional Medal of Honour on the grave of the Unknown British Warrior in Westminster Abbey.

Pershore. Market town of Worcestershire, England. It stands on the Avon, 113 m. from London and 8 m. from Worcester, with a station on the G.W. Rly. The chief building is the abbey church of the Holy Cross, with a fine tower and an Early English choir. Pershore is in the plum country. Vegetables are also grown. Other industries are the manufacture of agricultural machinery and jam. Cattle and horse fairs are held. An abbey was founded at Pershore about 690, and around this the town grew. At one time it sent two members to Parliament. Pop. 4,100.

PERSIA: IN ANCIENT & MODERN TIMES

Sirdar Ikbal Ali Shah, F.R.G.S.

Further information will be found in the articles on the cities, e.g. Ispahan and Teheran, the mountain ranges, and other physical features of Persia. See the biographies of Cyrus and other rulers; also Alexander the Great; Shiites; Sufism; Xerxes; Zend-Avesta; Zoroastrianism

In ancient times Persia included the whole of that great tableland enclosed on the S. by the Arabian Sea, on the E. by the Indus valley, on the W. by the Persian Gulf and Mesopotamia, and on the N. by the depression between the Caspian and the Aral Seas.



Persian arms

The total area of this region is nearly a million sq. m., but modern Persia occupies only some 630,000 sq. m., with a population of about 11,000,000.

PHYSICAL FEATURES. Almost everywhere the land in this vast upland region is traversed by lofty mountain ranges, which occupy more space than the plateau formation proper, and the plains themselves often stand at a considerable elevation above the sea. The Persian tableland as a whole has a mean altitude of 3,000-5,000 ft. Recent observations have confirmed the character of the general conformation of Persia as a "mountainous plateau," and have superseded the old idea

that it was a great sandy plain surrounded by mountains. But this notwithstanding, we are still rather ignorant of the disposition of the mountain system, especially in the interior of the country, although we now know that certain ranges extend for over a hundred miles at mean altitudes of from 8,000 to 10,000 ft., in some places rising to 16,000 or 17,000 ft., as in the case of the Kuh-Dinar range, which traverses the W. province of Fars.

Between the coastal mountain ranges and the sea there are few lowland plains except that of Khuzistan at the head of the Persian Gulf, but in the interior extensive level tracts occur between the parallel mountain ranges, like those of Ispahan and Shiraz in the W. To the E. and N.E. the country slopes towards the two great depressions of Seistan and Khorassan, where grassy valleys gradually stretch to sandy wastes



Persian flag;
green, white,
red

and salt marshes. Towards the E. the arable land is constantly menaced by shifting sands. Further to the E. again, enormous saline deserts, as the Dashti-i-Kavir or Great Salt Desert of Khorassan, occupy extensive spaces.

Persia is not a land of large rivers, and those which drain the W. and S.W. uplands tend to grow less toward the S. The largest are the Karkheh, the Karun, and Jarahi, flowing from the mountains of Kurdistan and Luristan to the Shatt-el-Arab, at the head of the Persian Gulf. The Karun is the only navigable river. S. of it is the river Tab, which has partially formed the Delta of Arabistan, a fertile and extensive alluvial plain. Of those water-courses which flow into the Caspian, the largest is the Kizil-Uzen, draining an area of 25,000 sq. m.

Climate and Products

Most of the level country in Persia is comprised in the two great provinces of Kerman and Khorassan. The uplands are subdivided into nine other provinces, which have for their nucleus Irak-Ajemi, the political centre of the state, which contains Teheran and Ispahan, the new capital and the old. The climate generally prevailing is one of great aridity combined with excessive heat, although on some of the uplands extreme cold prevails. But between the mountain ranges and the Caspian there is an abundance of rainfall. The Persian Gulf seaboard, however, is sultry and unhealthy.

In consequence of the general aridity, trees and large shrubs are infrequent, except on the rainy slopes adjacent to the border seas. Date palm cultivation has made great strides along the shores of the Persian Gulf; cedars, oaks, beech, and box flourish extensively on the N. slopes of the Elburz range. Food products include the cereals wheat, barley, and millet, and milk, which is usually taken curdled or fermented, but rarely pure. The lowlands yield silk, cotton, olives, opium, and tobacco, the trade in the last two being so profitable that ground needed for foodstuffs is given to these crops. The higher ground is pastoral country, from whose sheep and goats is gained the wool for the celebrated carpets.

In the N., lions, jackals, leopards, and cheetah are hunted; the bustard is found almost everywhere. There are pearl fisheries in the Persian Gulf. Mules, camels, and small horses are reared. Deposits of coal and iron in the Elburz, copper, lead, and other metallic ores in Kerman, copper and tur-



Persia. Map of the country showing its strategic situation in relation to the Persian Gulf and the Bagdad and Turkistan Railways

quoise in Khorassan, and rock salt near the gulf are known, but have been but little exploited. Petroleum in 1921 was being obtained in increasing quantity, and was sent by pipe line to Abadan. The chief exports are petroleum, opium, fruit, animals, raw cotton, rice, wool, and carpets.

Cotton goods and sugar form the bulk of the imports. Most of the trade is with the countries of the British Empire and Russia. There are six great trade routes, Enzeli-Teheran, Kazvin-Hamadan, Julfa-Tabriz, Astara-Ardebil, Ashabad - Meshedisar. Railways connect Teheran-Shah Abdul-azim, Julfa-Tabriz, Pine-bazar-Resht, Bushire-Borazjan. Roads suitable for wheeled traffic join Tabriz-Julfa, Teheran-Kom, Teheran-Resht, Kazvin-Hamadan, Meshed-Askabad, Kom-Sultanabad, Ispahan-Shiraz, Ispahan-Ahwaz.

Three-quarters of the people are Shia Mahomedans, one-tenth as many adhere to the Sunni sect, the rest are Jews, Armenians, and Nestorians.

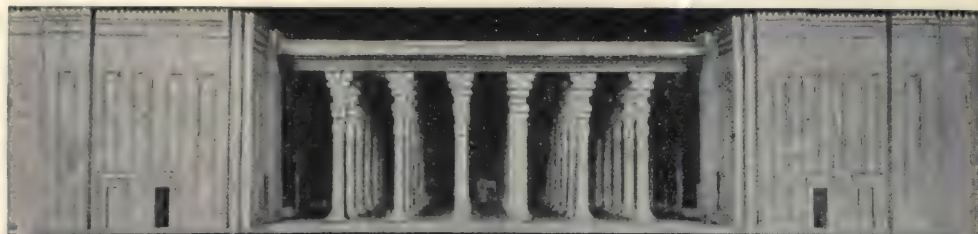
GOVERNMENT. The government of Persia is an absolute monarchy in the strictest sense of the term, but the shah is no longer a religious leader. The empire is divided into provinces ruled by governors-general directly responsible to the Crown, and these are again divided

into districts, cities, and their dependencies, and towns. Government in Persia, as it has been aptly put, "may be said to consist for the most part of an interchange of presents." Every official has to purchase his appointment and to pay for its continuance by an annual gift. Lowness of birth and station is no bar to promotion, the capacity to pay being sufficient to procure a post for anyone.

Attempts at Reform

The bureaucracy of Persia is confused and without system. An enormous staff of civil servants exists whose duties are not properly apportioned. Few of them are paid, and they are supposed to remunerate themselves by extortion. In modern Persia many reforms have been effected, including the institution of a letter post, the telegraph, newspapers, banks, higher education, and something, too, in the way of road making.

HISTORY. The first inhabitants of the country in historical times appear to have been of Sumerian stock, but at a later date an Aryan race descended upon Iran, who, in the course of time, conquered the aborigines and laid the foundation of an Aryan kingdom. On the fall of the Assyrian Empire this Aryan people, known as the Medes, became the heirs of its political power, and to a great extent



1. Reconstruction, in the Louvre, Paris, of the palace of Darius at Susa. 2. Pavilion of the throne room of Darius, Susa. 3. Frieze in enamelled tiles representing archers, palace of Darius, Susa. 4. Frieze in enamelled tiles, Susa. 5. Tile depicting a lion rending a unicorn, Persepolis. 6. Reconstruction by C. Chipiez of the palace of Darius, Persepolis

PERSIA: ART AND ARCHITECTURE OF OLD-WORLD SUSA AND PERSEPOLIS



1. Chamberlain introducing tribute bearers, from a relief at Persepolis. 2. Fire altars near Naqsh-e Rostan, relics of ancient Persian nature worship. 3. Capital and, 4, base, of column from the palace of Artaxerxes

Mnemon at Persepolis. 5. Reconstruction by C. Chipiez of the hypostyle hall in the palace of Xerxes, Persepolis. 6. Reconstruction by C. Chipiez of the terrace of palaces at Persepolis

FERSIA: REMAINS AND RECONSTRUCTIONS OF ITS ANCIENT ARCHITECTURE

of its civilization. Media became a powerful empire under Cyaxares (d. 584 B.C.), who overthrew both the Assyrians and the Scythians. When he came to the throne the paramount power of the East was Semitic, but he left it Aryan. His son, Astyages, was attacked by an army of Persians under Cyrus, and in 550 the empire of Media passed into the hands of the kindred Aryan people of Persia.

Decline of the Empire

After conquering Croesus, king of Lydia, and overthrowing Babylon, Cyrus was assassinated by Tomyris, queen of the Massagetae. Cambyses, his eldest son, succeeded him in B.C. 529. He invaded Egypt, which he brought under tribute, but his mind became unhinged and he destroyed himself. Darius, a usurper, attacked and reduced the Greek cities of Thrace and Macedonia and refounded the Persian Empire on a more solid basis. Xerxes in 481 launched a great attack upon Athens, but received a check through the defence of Thermopylae by the Spartans. He won a naval engagement at Artemisium, after which he succeeded in taking Athens, but he was badly beaten in a sea-fight off Salamis and retreated in great disorder to Persia. Artaxerxes and Cyrus the Younger saw the beginning of the decline of the Persian Empire. The rise of Macedonia under Philip and Alexander brought about the temporary fall of Persia. Persepolis and Pasargadae were occupied in 330, and the victorious Macedonian tide swept E., Hellenising a very large portion of Central Asia.

At the death of Alexander, his empire almost at once fell into dismemberment, and what is now Persia was ruled by the dynasty of the Seleucids, descendants of one of the generals of Alexander. The Parthians, a Turanian tribe from the N., whose home lay within the modern provinces of Khorassan and Astrabad, produced the Arsacid dynasty, about 249 B.C., who gradually seized the whole of Persian soil, but it was menaced by the surrounding barbarians. It had, however, relations with China and Rome on either side, and the latter power invaded it in 53 B.C. Successive Roman generals invaded Parthia, and after long-continued fighting, in which victory inclined, now to one, now to the other side, a truce was observed.

The Parthian power gradually declined, and its place was taken by the Sassanian dynasty, which marked a new and splendid epoch in Persian history. Under its sway, Iran recovered its independence

instead of constituting one of the provinces ruled by a Parthian king. Once its king, Ardashir, had fully established his power, he threw down the gauntlet to the Romans, and inflicted a heavy defeat upon them. He was also instrumental in reviving the Zoroastrian religion, with its picturesque rites of fire-worship. His successor, Shapur, defeated the Romans on several occasions, and in A.D. 260 captured Valerian, the Roman emperor. He was, however, beaten by Odenathus of Palmyra, whose country became a buffer state between Persia and Rome.

The Sassanian dynasty included a number of brilliant kings, of whom Shapur the Great (310-381) who also carried on war with Rome, is the most notable. His successors had a long and arduous struggle with the White Huns, Bahram (d. 448), mentioned by Omar Khayyám as a great hunter, defeating them with tremendous loss, as did his descendant Firuz, who, however, was finally worsted by them in A.D. 483, when Persia fell under their dominion. The Sassanian dynasty, however, ultimately succeeded in crushing the White Huns in 523. During the period of this dynasty commercial and artistic relations were founded with China, to the lasting benefit of both Persian and Chinese art. With the coming of Noshirwan in 531 peace was concluded with Byzantium, but was soon broken by that monarch, who captured Antioch in 540, and spread terror throughout Syria, extorting an enormous indemnity.

Coming of the Turks

In this reign we first hear of the coming of the Turks from Central Asia. Noshirwan committed the folly of poisoning certain Turkish envoys, whereupon their countrymen invaded Persia. They were, however, easily repulsed. Once more Byzantium made war upon the Persian monarch, who surprised the invaders by night, and inflicted a crushing defeat upon them. Hormazd, son of Noshirwan by the daughter of the Khan of the Turks, exhibited tyrannical tendencies and entangled himself in war with Byzantines. His Turkish kinsmen took advantage of this, and invaded his realm, but were badly beaten, 588, and lost an enormous booty. Tired of the irregularities of Hormazd, his nobles conspired against him, and he was assassinated.

His son, Chosroes II (*q.v.*) was beaten in the field by his late father's enemies, but in 591 was restored by a Byzantine army. Taking advantage of the confusion in the Byzantine empire, he invaded Syria

in 611, sacked Antioch, and took Damascus, Jerusalem, and Alexandria. In 623, however, Armenia, then a dependency of Persia, was invaded by Heraclius, and Chosroes was taken by surprise. He fled, and was never afterwards able to rally. Finally he was taken prisoner, and put to a lingering death. The most magnificent of the Persian monarchs, he had no capacity for administration, and was scarcely a match for the brilliant Heraclius.

Arab Conquests

The Persian empire, worn out by the long struggle with Byzantium, and with only a boy as heir to the throne, was nearing its end. During a period of anarchy, in 633 the Arab leader Khalid led a Beduin army against Iran, defeated the Persian forces, but retired later. The Arabs returned, however, under Mothanna, and Yezdigird, the last of his line, was entirely broken at the battle of Nehavend in 642. For some years Persian resistance continued, but finally the Arabs poured into Iran, which became a dependency of the Ommiad Turks. These conditions obtained until 749, when a revulsion against Arab methods and language set in.

The Abbasides, a rival family to the Ommiads, conspired against the latter, and massacred many of their adherents. The Abbasides found their strongest adherents in Persia, but still rebellion broke out from time to time. During the Golden Age of Islam, which perhaps found its apogee in the reign of Haroun Al Raschid, Persia was still entirely under the regime of the Caliphate, but national feeling had never become extinguished, and the Zoroastrian religion continued to be practised in secret. But the Seljuk Turks had now occupied Transoxiana, and thus threatened the Arabian empire. Finally, they prevailed, and in 1037 founded a dynasty.

The Crusades affected the fortunes of Persia only indirectly, but undoubtedly Persia, as a great repository of art, science, and mysticism, exercised, like Byzantium, much influence upon the European invaders, whose dress, horse-equipment, miniature painting, art of design, tapestries and mode of thought were all directly influenced by Persian models.

The picture of Persian history grows darker during the devastating invasion of the Mongols, who swept over W. Asia and Europe like a destroying wind. Invading Turkistan in 1218, they advanced to Transoxiana under Jenghiz Khan, and onward to Merv and Khorassan, which they speedily overran. They devastated W. and

N.W. Persia, nearly exterminating the population. Later on the Caliphate was extinguished, and Persia became a Mongol principality under Mangu in 1251.

This inaugurated what is known as the reign of the Il-Khans of Persia. Its greatest monarch was Ghazan Khan (1295), who conducted campaigns in Syria and S. Persia, and had intimate relations with Byzantium and the W. powers. This condition of affairs lasted until the coming of Tamerlane, who, as governor of Mongolia, observed the state of anarchy into which Transoxiana had fallen and determined to annex it. He fitted out an expedition for this purpose in 1360, overran Persia and Mesopotamia, as well as a large part of India, and from his fourth son, Shah Rukh, sprang the line of the Timurid Dynasty of Persia, which, at first virile and devoted to the arts, ended in a series of *rois fainéants*. This state of affairs was relieved by the appearance of Babar, who, after vindicating his right to the throne as a boy, seized also upon Kabul in 1504, and carried out several expeditions into India, a feat of arms which resulted in the founding of the dynasty of the Moguls.

First English Embassy

The Safavi dynasty arose towards the end of the 15th century. Ismail, its founder, was a popular favourite in Persia because of his partiality to the Shia doctrine. He annihilated the last of the Timurids, drove the Uzbeks out of Khorassan and Merv, and expelled an invasion of the Turks under Selim the Grim. In 1534, during the reign of Tahmasp, Persia was once more invaded by the Turks under Solyman the Magnificent, but the results of the campaign were indecisive, and a peace treaty was concluded in 1555. This reign is marked by the first English embassy to Persia under Anthony Jenkinson.

We now come to the spacious times of Shah Abbas I (*q.v.*), the Great, grandson of Tahmasp. Nominally governor of Khorassan, and as a child a puppet in the hands of his advisers, he succeeded in gaining the Persian throne, and was soon afterwards menaced by a Turkish invasion. He made peace with the Turks, however, to concentrate against the Uzbeks. Reorganizing his army, he carried out several successful campaigns against Turkey during 1602-27.

The rounding of the Cape of Good Hope opened up the East by sea, and in 1507 the Portuguese sent an expedition against the port of Hormuz, the modern Bander Abbas, where they established

themselves in 1515. England began to trade with Persia by sea in 1614, her chief quest being for silk. The English assisted the Persians to clear the Portuguese out of Hormuz. Towards the middle of the 17th century the Dutch began to open up trade at Ispahan and were followed by the French, who, like other Europeans, regarded Persia as a regular mine of wealth to be exploited. The Safavi dynasty now began to decline. The Uzbeks and Turks were once more troublesome, and the first Russian embassy to Persia in 1664 boded little good for the future.

It was during this period of storm and stress that a power nearer at hand than any European community began to manifest signs of vigour. The rise of the warlike

and virile Afghan race in the hill-country to the N.E. of Persia had for some time been a source of uneasiness to the Persian rulers who had been attacked by them as well as by the Moguls of India. Kandahar was then a Persian province which had as its governor Gurgin Khan. But he was deposed by a conspiracy of Mirvais, an Afghan chief, who, falling upon the Persian troops who occupied Kandahar, put them to the sword. Out of these circumstances arose the independence of Afghanistan, which newly consolidated power began to make raids into Persia, conquering it,

and overthrowing the Safavi dynasty, 1722. Later, however, it was expelled by Shah Mahmud. In 1724 W. Persia was overrun by the Turks. They were defeated in 1726 by Ashrif, who also routed the Afghans in 1730.

Encroachments of Russia

In 1736 Nadir Kuli, a great soldier, was crowned shah of Persia. He did more than any of his predecessors to consolidate the Persian power. On his assassination he was succeeded by Ali Kuli, first king of the short-lived Zand dynasty. Aga Mohammed Khan founded the Kajar dynasty, 1795, and beat back more than one Russian invasion. He was followed by various pretenders. In 1801 Russia annexed Georgia. Disastrous campaigns followed which ended in the treaty of Turkmanchai in 1828. From 1830 to 1860 Persia made every effort to recover provinces in Afghanistan to balance her losses to Russia in the W.

These campaigns were viewed with apprehension by the rulers of India, who foresaw that if Persia



Persia. Types of the people. 1. Chieftain. 2. A mother and her baby travelling in wooden panniers. 3. Woman in walking dress. 4. Peasant at prayer. 5. Woman in indoor costume

were successful, she would merely make a road for Russia to the country S. of the Hindu Kush. They therefore addressed themselves to the task of keeping Afghanistan outside the spheres of influence of both Russia and Persia. This led to misunderstandings between Great Britain and Persia, and to the Anglo-Afghan alliance of 1855. Reluctantly Great Britain declared war against Persia in 1856, and peace was concluded in the following year, the shah agreeing to recognize the independence of Afghanistan.

Russia now began to advance in Central Asia with giant strides. In 1849 she had occupied the valley of the Syr Daria, in 1876 she annexed the khanate of Kokhand, and by 1873 had conquered Khiva. In 1881 the Turcomans were crushed by Skobelev at Geok Tepe. This state of affairs was not improved by the question of the boundary of Seistan which arose between Persia and Afghanistan in 1863, and which was not settled until 1872. In 1905, owing to popular discontent, a constitution was granted to the people.

In 1907 an Anglo-Russian treaty defined the respective spheres of influence of the two powers in Persia. In 1915 the country became a war theatre. German officers were sent there in that year and, supported by Turkish troops, began a campaign for driving out the British and Russian colonies. To restore the authority of the Persian government and to protect British interests, Sir Percy Sykes (*q.v.*) landed at Bander Abbas in 1916. He raised a force to replace the local police who had joined the Germans. Meantime, Russian troops had arrived in Persia and helped to save the capital and the shah.

In 1919 an agreement was concluded between Great Britain and Persia reiterating past undertakings to respect the independence and integrity of the latter. This was denounced by Persia in 1921, in which year Persian-Afghan and Persian-Russian treaties were concluded.

Language and Literature

The language of Persia is connected with the great Indo-European linguistic system, of which, indeed, it is one of the oldest exemplars. It is written in the Arabic alphabet. Persian literature takes a high place among the literatures of the world. The old Persian inscriptions and the Zend Avesta take us back to the sixth century B.C. and possibly earlier. The Pehlevi tongue belongs to the Sassanian period from the third to the sixth century A.D. Persian in its modern form is perhaps a thousand years old. It

was really a renaissance of the old national feeling in the country which brought it into being a century or two after the Arab conquest, and it was responsible for the brilliant outpourings of Firdausi, Sadi, Hafiz, and Omar Khayyám. Among the greatest writers are the romantic poet Nizami (d. c. 1203), the dervish Jelal-ul-din Rumi (1207-73), and the mystic Jami (d. 1492).

The poetry of this richly endowed and imaginative people surpassed in bold and extravagant hyperbole, fantastic imagery, and emotional appeal. The Persian poet heaped metaphor upon metaphor. He was incapable of seeing that what was intrinsically beautiful in itself might appear superfluous and lacking in taste when combined with equally graceful but discordant elements. But there is no doubt as to his eminent ability to coin beautiful phrases, and the mystic and philosophical spirit in which these are couched has perhaps never been surpassed.

Influence of Sufism

Among the most famous poets of Persia were the Sufis or mystics, whose spirit has permeated Persian literature and the Persian mind to a remarkable extent. Sufism has been called the offspring of Neo-Platonism, but it has more probably been sophisticated by Brahmanic or Buddhist influences. It commenced to flourish towards the end of the 10th century, and regarded God not only as the sole source of good, but of being and beauty as well. The great Sufi poet is Jelal-ud-Din, whose work, the *Masnavi*, has influenced thought in Persia and Turkey.

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Persian Gulf. Arm of the Indian Ocean, the ancient Persicus Sinus. It stretches N.W. from the Gulf of Oman on the S. to the Shatt-el-Arab and the adjacent regions on the N., is more than 500 m. long, and has an area of 75,000 sq. m. It is bounded S. and W. by Arabia, N.W. by Lower Mesopotamia, and N. and E. by Persia.

For the most part its shores, flat on the W. and rising into headlands and heights on the E., are sterile. Its one great river is the Shatt-el-Arab. Its chief islands are the Bahrein group on the W., Babian (Bubiyan) and Abadan on the N., and Kishm on the E. Its harbours are Koweit, Bushire, Lingah, and Bander Abbas, but Basra may now be included.

In the 17th century the British and the Portuguese contended for the mastery of the gulf. Early in 1622 the British captured a Portuguese fort on Kishm, and afterwards, in union with a Persian force, captured and destroyed Hormuz, the headquarters of the Portuguese. During the Great War the British made much use of this area, which strategically is the key to almost the whole of the Middle East. See Basra; Fao; Mesopotamia.

Persigny, JEAN GILBERT VICTOR FIALIN, DUC DE (1808-72). French statesman. Born Jan. 11, 1808,



Duc de Persigny,
French statesman

he entered the army, and espoused the Bonaparte cause. He planned the attempts at Strasbourg, 1836, and Boulogne, 1840, and took a prominent part in the revolution of 1848, and the *coup d'état* of 1851. Minister of the interior, 1852, and ambassador to England, 1854-60, the enmity of Eugénie caused his fall in 1863. He died Jan. 11, 1872.

Persimmon or VIRGINIAN DATE-PLUM (*Diospyros virginiana*). Small tree of the natural order Ebenaceae, native of N. America. It has rather thick, oval-oblong, alternate leaves and pale yellow, bell-shaped flowers. The yellow fruits are plum-like; after exposure to frost they become sweet and edible. The wood is very hard and blackish. See Ebony.

Persius (A.D. 34-62). Roman satiric poet, whose full name was Aulus Persius Flaccus. Born of a noble family at Volaterrae, in Etruria, Dec. 4, A.D. 34, he studied Stoic philosophy in Rome under Cornutus, and died Nov. 24, 62. He left six Satires, consisting of 650 hexameter lines which display original genius, in spite of their immaturity, excess of literary allusion, and obscure style. The Satires have been edited, with a prose translation, by J. Conington, 1872, and there are verse translations by Dryden and Gifford.

Person (Lat. *persona*, theatrical mask). A human being, or individual. In theology it is used for each of the units of the Trinity. In grammar it indicates the distinction between the person speaking, the person spoken to, and the person spoken of. See Trinity.

Personal Equation. In science, a constant deviation from the correct result of a series of observations due to the personality of the observer. Such a deviation has always to be allowed for in accurate scientific investigations. In astronomy there is often a comparatively large difference, for example, between actual results obtained by different observers, though when the known corrections for personal equations have been applied the results are within close agreement with one another. To obtain a true estimate of any particular judgement of a person the personal equation must be taken into account.

Personal Exception or OBJECTION. Term in Scots law almost equivalent to estoppel (*q.v.*) in English law, constituting a conclusive admission which cannot be denied. Thus a man is barred by personal exception from disputing his own act and deed, which is conclusive against him and against others claiming under him, even in respect of the facts recited in it; and also from averring against any matter of record to which he has been made a party.

Personality (Lat. *persona*, theatrical mask, character). Etymologically, the quality which enables a being to sustain a part in life. Generally, those qualities which distinguish human beings from things, or one human being from another, or, in a narrower sense, existence as a self-conscious being. An animal may be conscious, but not being conscious of itself as the subject of its experience, has no personality.

Persons, as opposed to things, are individual, conscious, intelligent and free. Things possess no individuality, but only exist in or as compounds, whereas each person is conscious of his own existence as one, can reflect upon himself, can speak of an "I." Further, the idea of personality is connected with the moral law; it carries with it the possession of rights and duties, the obligations of which can only be appreciated by beings who are free and intelligent. As compared with his fellows, each person has a certain particular consciousness of his own, entirely distinct from and independent of those of others.

According to certain thinkers the word personality is meaning-

less, and the distinction between persons and things artificial. Things alone exist; persons are mere appearances, collective varieties of organic forms, and the Ego ("I") is only a collection of states of consciousness. The term personality is also used to express the continuance of a person's distinguishing qualities, of one's personal identity, in spite of bodily and mental changes at different periods of development. See Psychology.

Personal Property. Term peculiar to English law. It meant originally all property in respect of which a *real* action (*i.e.* an action for the *res* or thing) would not lie; but in respect of which only a personal action against the defendant would lie. It comprises all goods, chattels, choses in action, leaseholds; but not freeholds, copyholds, or things thereunto annexed. The distinction is quite illogical, and the most logical division of property is into movable and immovable, as in every system of law except the English. On an intestacy, personal property is divided among next of kin, while real property descends to the heir-at-law.

Personal Security. Popular phrase which in law has no meaning at all. By "a loan on personal security" is meant a loan for the repayment of which the lender has only the personal credit or promise of the borrower; that is, he does not take any mortgage, or bill of sale, or pledge which he can realise if the loan is not repaid. Thus a loan on personal security is a loan which is not secured, and the phrase is self-contradictory.

Personation (Lat. *persona*, mask, person). In English law, pretending to be someone else. A person who does this in order to obtain property is guilty of a felony by the False Personation Act, 1874, passed in consequence of the Tichborne case. To personate a master so as to give a false character to a servant is a misdemeanour under an old statute of George III; and the Ballot Act, 1872, made it a criminal offence to personate a voter at a parliamentary or municipal election. Very often the offence of obtaining or attempting to obtain money, etc., by false pretences is personation.

Perspective (Lat. *perspicere*, to look through). In art, the representation of objects occupying different planes upon a single plane surface in such a way that the representation shall appear the same to the eye as the objects themselves; also the science or laws determining such representation. The colour as well as the

size and form of objects being affected by distance, perspective is divided into two species, linear and aerial. Linear perspective concerns itself with the apparent form and grouping of objects, aerial perspective with their distinctness and colour. The former thus belongs strictly to geometrical science, and the latter to the less scientific domain of pictorial art. So far, however, as painting and sculpture are concerned, the importance of either kind of perspective cannot be exaggerated.

In making a perspective plan of the objects to be introduced into a picture, it is necessary to draw (1) a base line representing the lowest limit of the picture as it appears to the operator; (2) a horizontal line representing the horizon of the picture from the same angle of vision; (3) a vertical line, drawn from the base line to the horizontal, meeting the latter at a point called the point of sight. Often this point of sight comes in the centre of the picture, but just as frequently it is to the right or left, though always on the horizontal line. The base, horizontal, and vertical lines are the skeleton of the perspective.

All parallel lines in nature, when projected, will, if the different objects be correctly drawn, meet at one point which is called the vanishing point. The latter is not necessarily within the limits of the picture itself; it may, indeed, be far outside them. But wherever it is, the main principle of linear perspective remains the same, *viz.*, that straight lines in nature, which appear parallel, are only parallel, when projected on the perspective plane, in the rare cases when they are found to be parallel to the base or vertical line; all others meet at vanishing points which may be above, or below, or on the horizontal line.

Aerial perspective is concerned with the colour of objects, which is governed by atmosphere acting as a screen or veil, and the greater the body of atmosphere, *i.e.* the longer the distance between the spectator and the object, the less bright does a colour appear. It first arose out of the growing importance of the landscape background, but its scientific application is the product of modern art. See Drawing; consult also The Theory and Practice of Perspective, G. A. Storey, 1910.

Perspiration. Excretion of water from the skin through the sweat glands. In the human being, the sweat glands consist of small coiled tubes situated in the deepest part of the true skin, from which



Perth, Scotland. General view across the Caledonian Railway bridge over the Tay

Perth

a duct passes up to the surface. The secreting tube is lined by columnar cells, outside of which is a layer of muscular fibres. Sweat glands are abundant all over the skin, but are most numerous on the parts which are free from hair, particularly the palms and soles.

There is always a certain amount of activity in the sweat glands, but the secretion, as soon as it reaches the surface, is evaporated, and thus normally the skin feels dry. This is accordingly known as insensible perspiration. Under the influence of exercise, heat, or certain emotions, the activity of the sweat glands is greatly increased, and the secretion then collects on the surface, forming beads or drops of sweat. This is sensible perspiration. The physiological function of sweating is to assist in regulation of the body temperature. Anidrosis is abnormal diminution in the quantity of sweat excreted. It is seen in diabetes, myxoedema, and some affections of the nervous system. See Hyperidrosis.

Persulphuric Acid. Acid formed when sulphur heptoxide (S_2O_7) is dissolved in water. It is made by the action of sulphuric acid on ammonium or barium persulphate. It is formed during the working of accumulators, owing to the electrolysis of the sulphuric acid used in accumulators. On dilution with strong sulphuric acid mono-persulphuric acid is formed. The salts of persulphuric

acid known as persulphates were first prepared by Marshall in 1898, and are now made on a manufacturing scale for use as oxidising agents.

Pertab Singh, Sir (1845-1922).

Indian ruler and soldier. Early in his career he was put at the head of



Sir Pertab Singh,
Indian soldier
Vandyk

the administration of Jodhpur by his brother the maharaja. In this capacity he introduced reforms, constructed railways, etc. In 1878 he was a member of the mission to Kabul, and

took part in the Mohmand expedition, 1897, and the Tirah campaign, 1898. He led Jodhpur imperial troops in China, 1900, and two years later became ruling chief of Idar State in Gujarat, but abdicated in favour of his son. An hon. commandant of the Imperial Cadet Corps, he served in the Great War, 1914-15, and was promoted lieutenant-general. Created K.C.B. in 1901, he was made G.C.B. in 1918. He died, Sept. 3, 1922.

Perth. Royal and municipal burgh and county town of Perthshire, Scotland. On the Tay, it is 48 m. by rly. N. of Edinburgh, and is served by the Caledonian, N. British, and Highland Rlys. The wooded hills of Kinnoull, 729 ft., and Moncrieffie, 725 ft., the magnificent river, and the back-

ground of the Grampians combine to form an environment fully justifying its being called the Fair City. An ancient city, it was noted for its noble ecclesiastical edifices, but of these there remains only the 13th century cruciform church of S. John, from which it derived its former name of St. Johnstown, and in which in 1559 John Knox preached his celebrated sermon against idolatry. Other prominent buildings are S. Ninian's episcopal cathedral (1850-90), the new city hall, the general convict prison for Scotland, and the municipal buildings, the latter on the site of the palace in which the Gowrie conspirators met. The city has a large infirmary, public library, museum, and barracks. There are several schools, but the castle and the market cross have been pulled down.

An imposing nine-arch bridge, 840 ft. long, across the Tay communicates with the suburb of Bridgend, and along the W. bank of the river extend two public parks—the N. and S. Inch. Dyeing is the staple industry, and brewing, ironfounding, and the manufacture of ink, linen, gauge glasses, floorcloth, and chemicals are carried on. From here steamers go to Dundee and other ports on the E. coast.



Perth arms



Perth, Australia. North Perth seen from King's Park; in the right foreground is Mount's Bay

It has valuable salmon fisheries and large cattle markets are held.

Said to have been founded by Agricola in A.D. 70, Perth has a wealth of historical memories. A burgh in 1106, it was constituted a royal burgh in 1210, and was the Scottish capital till 1482. Many times besieged, it was taken by Bruce in 1311, and Edward III in 1335. The scene in 1396 of the combat between the Quhele and Chattan clans, described by Scott in *The Fair Maid of Perth*, and of the murder of James I in 1437, it was captured by Montrose in 1644, and again by Cromwell in 1651. Market day, Fri. Pop. (1921) 33,200.



Perth, Australia. Plan of the city, showing the jetties on Perth Water and the suburb of South Perth

Perth. Capital and city of Western Australia. It stands on the Swan river, 12 m. from its mouth, and about 1,700 m. from Melbourne. The chief buildings are those erected for public purposes—Government House, Parliament House, town hall, mint, public library, and others. The city has a museum and art gallery, observatory, zoological gardens, and extensive public parks. There are cathedrals for both Anglicans and Roman Catholics, and a university, that of W. Australia. It has a service of electric tramways, while near are several racecourses. South Perth is a suburb across the river, here known as Perth Water. Perth was founded in 1829, and made a municipality in 1856. Its growth, however, was due to the discovery of gold in the neighbourhood soon after 1890. Pop. 41,000.

Perth, EARL OF. Scottish title borne by the family of Drummond since 1605, when James, Lord Drummond, was made earl of Perth. His nephew James was the

3rd earl, and then came the latter's son James (1648–1716), who was made a duke by James II when in exile. He had been lord chancellor of Scotland, but after 1688 he left the country. The three succeeding dukes, for such they were called although the title had no validity, were prominent Jacobites, and members of the family were in the field both in 1715 and 1745. The title became extinct when the 6th duke died in 1760. After 1760 the earldom was claimed by relatives of the 1st duke, but without success until 1853, when the title was conceded to George Drummond, a descendant of the 1st earl of

Melfort, a brother of the 1st duke of Perth. The story of the earls of Melfort is very like that of the earls of Perth. They also were Jacobites, received a dukedom from James II, and lost practically all in the Stuart cause. However, abandoning the dukedom, George Drummond was recognized in 1853 as earl of Perth and Melfort, and the Drummonds still hold the double title. The Drummond estates passed in the 19th century to the earls of Ancaster.

Perth Amboy. City of New Jersey, U.S.A., in Middlesex co. A port of entry, it stands at the mouth of Raritan river, on Raritan Bay, 16 m. S.S.W. of Newark, and is served by the Lehigh Valley and other rlys. It has a secure and commodious harbour and trades in coal. Manufactured products include chemicals, bricks, terracotta, iron, steel, copper, and lumber. Shipbuilding, smelting, and refining are other industries. Perth Amboy, settled in 1683, became a city in 1718. Pop. 41,700.

Perthes. Village of France, in the dept. of Marne. Officially known as Perthes-les-Hurlus, it is 4 m. N.E. of Suippes in the district known as Champagne Pouilleuse, and was prominent in the Great War. Fighting took place here in Dec., 1914, between the French and the Germans, when the German trenches were heavily attacked by the former. It was captured by the French on Jan. 8, 1915, and heavy fighting occurred near it throughout the next few months. Retaken by the Germans in their summer offensive of 1918, it was the scene of heavy fighting on July 15. It was finally recovered in the battles following the Allied counter-offensive of July 18. See Champagne, Battles of; Marne, Battles of the.

Perthes, FRIEDRICH CHRISTOPH (1772–1843). German publisher. Born April 21, 1772, after an apprenticeship to the trade he became a bookseller in Hamburg, 1796. Mixing in literary and political circles, his strong liberal but anti-French sentiments led him to produce *Das Deutsche Museum*, 1810–11, a patriotic effort which necessitated his flight from Hamburg to avoid French persecution. In 1821 he settled at Gotha, and founded a publishing business, which rose to be one of the greatest in Germany. He died May 18, 1843. *Pron.* Pair-tez.

Perthite. In geology, name given to a variety of red felspar found at Perth, Ontario, Canada. Consisting of laminations of orthoclase and albite, it is used as a gem stone. See Orthoclase.

Perthshire. County of Scotland. Its area is 2,294 sq. m., making it the fourth largest in the country. It belongs partly to the Highlands and partly to the Lowlands, and is pierced by the Firth of Tay. The surface is mountainous. In the N. and W. are the Grampians; a large number of its heights exceed 3,000 ft., among them being Ben Lawers, Ben More, Ben Lui, and Schiehallion. In the S. and E. are the Sidlaw and Ochil Hills. The chief river is the Tay; among its tributaries are the Almond, Earn, Tummel, and Lyon. The Teith and Allan flow to the Forth. The largest of many lochs are Tay, Erich, Vennachar, Rannoch, Katrine, and Achray. Across the S.E. stretches the valley of Strathmore, and in the E. is the Carse of Gowrie. Beautiful glens—Garry, for instance—abound, and herein are the Trossachs, the pass of Killiecrankie, and other famous spots.

Perth is the capital and largest town. Other places in the county are Crieff, Blairgowrie, Dunblane, and



Perthshire. Map of the Scottish county celebrated for its picturesque glens, passes, and lakes

Auchterarder. Holiday resorts include Pitlochry, Aberfeldy, Comrie, and Callander. In the county, too, are Abernethy and Blair Atholl. Agriculture is the chief industry, but a large proportion of the land is given up to deer forests and grouse moors. Oats, barley, and wheat are grown; horses and cattle are reared. A large number of sheep feed on the hills. The county is served by the Cal., N.B., and Highland Rlys. With Kinrossshire two members are returned to Parliament. Perthshire was the headquarters of the kingdom of the Picts. Their capital was in turn Abernethy, Forteviot, and Scone, and Scone long remained the coronation place of the Scottish kings. Pop. (1921) 125,515.

LITERARY ASSOCIATIONS. These are especially notable in connexion with Scottish song. Caroline, Baroness Nairne, author of *The Land o' the Leal*, *Caller Herri*, and other familiar songs, was born in the Auld House of Gask. Henry Adamson (d. 1639), the friend of Drummond of Hawthornden and author of *The Muses' Threnodie*, was born at Perth. David Mallet, or Malloch (c. 1705-65), was born at Crieff; Dugald Buchanan (1716-68) was born at Ardoch; and Duncan MacIntyre (1724-1812), although of Argyllshire birth, is said to have found much of his inspiration for his poems in Perthshire. Robert Nicoll (1814-37), poet and prose writer, was born at Little Tulliebeltane, Auchtergaven; George Gilfillan at Com-

rie; and Charles Mackay, author of *Cheer, Boys, Cheer*, at Perth.

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Perthus or **PORTUS**, COL DU. Pass over the E. Pyrenees, on one of the roads leading from Perpig-

nan in France to Figueras in Spain. It is defended on the French side by Fort Bellegarde.

Pertinax, PUBLIUS HELVIUS. Roman emperor from Jan. 1 to Mar. 28, A.D. 193. A man of humble birth, born at Alba Pompeia in Liguria, he entered the army. He distinguished himself in the wars with the Parthians and in Britain, and after the murder of Commodus he was invited to become emperor. But the discipline which he attempted to re-establish proved so irksome to the spoilt soldiery that he was murdered in less than three months. On his death the empire was sold by auction to Didius.

Pertinax. Nom-de-plume of André Géraud, French publicist. Born Oct. 18, 1882, he was educated at the university of Bordeaux. From 1908-14 he was London correspondent of the *Echo de Paris*, in which an article by him, signed "Pertinax," appeared daily after 1917. During the peace negotiations he stood for the maintenance of the alliances created by the war, and assailed the League of Nations as inconsistent therewith.

Perturbation. Term used in astronomy for the disturbance in the orbits of members of the solar system and comets caused by the attractions which they exert on one another. It was due to unexplained perturbations in the movements of Saturn that Adams and Leverrier were able to predict the existence of the planet Neptune.

Pertussis. Scientific name for whooping cough (*q.v.*).

PERU: THE LAND OF THE INCAS

F. A. Kirkpatrick, Author of *South America and the War*

Supplementary to this article the reader is referred to the entries on the cities and towns, lakes, and rivers of Peru. See *Andes*; *Chile-Peruvian War*; *Cordilleras*; *South America*; also *Inca*; *Yunca*

Peru (El Perú), a S. American republic bordering the Pacific and lying wholly within the Southern



Peru arms

Tropics, forms an irregular oblong stretching about 1,200 m. from N.W. to S.E. The area is uncertain owing to frontier questions pending with Brazil and Ecuador. But, excluding the two provinces occupied by Chile since 1883 and still claimed by Peru, it may be estimated at about 650,000 sq. m. The adjoining republics are Ecuador and Colombia on the N., Brazil on the E., Bolivia on the S.E., and Chile on the S.

Peru is not in itself a distinct geographical region, but forms

part of the Andine system of S. America, being traversed throughout its whole length by the stupendous mountain system of the Cordilleras. The Peruvian part of this gigantic mountain system has a peculiar magnificence of its own, owing to the fact that the Western Cordillera here rears itself precipitously, like a huge irregular wall, broken by many ravines, almost from sea level to a height of 16,000 ft., even the passes between the peaks mostly exceeding 14,000 ft. This W. range forms a continuous barrier running parallel to the



Peru flag; red, white, and red

Pacific coast. A broad plateau, from 11,000 to 13,500 ft. above sea level, stretches between this range and the still loftier chain of the Eastern Cordillera, which rears its snowy peaks above 20,000 ft. The plateau is broken by many subsidiary mountain masses, and in its N. part is traversed by the central Cordillera. Near Cuzco the ranges converge, and are heaped together into the rugged transverse ridge or "knot" of Vilcanota. South of this the plateau widens out between two ranges, enclosing L. Titicaca and stretching into the yet broader Bolivian plateau. Lake Titicaca forms the main part of a separate hydrographical system of inland drainage.

This vast mountain system cuts Peru into three distinct longitudinal zones; the rainless coastal plain, from 30 to 60 m. wide; the *sierra* or mountain system itself, about 250 m. wide; and the *montaña*, the remote inland region of forest which clothes the eastern slopes of the Andes, and stretches far into the Amazonian basin. The mountains determine the rainfall and the extraordinary contrast between the E. and W. regions of the republic. The moist trade-winds, sweeping across the continent from the Atlantic, upon striking the barrier of the E. Cordillera, are forced upwards and chilled, and shed copious rains.

Coastal Plain and Montaña

On the other hand, the coastal plain between the Andes and the Pacific is rainless, although in the winter—from about May till October—the daily *garra*, a mist often breaking into a slight drizzle, moistens the soil and revives vegetation. The many short and rapid rivers descending from the Andes to the Pacific permit strips of irrigation, which yield abundant crops of sugar, cotton, and coffee. Between these cultivated strips the coastal plain is almost desert.

The *montaña*, a region undeveloped, mostly difficult of access, and in parts still unexplored, presents a striking contrast to the other parts of the republic. The *montaña* slopes down from the E. spurs of the Andes to the interior of the continent. Here flourishes the vast virgin forest of the damp Amazonian basin. The waters teem with fish; serpents and alligators abound; gorgeous birds of every size, from the gigantic heron to the tiny humming-bird, haunt the woods and waters. Innumerable streams wind through the forest, feeding the upper waters of the Amazon. Three great navigable rivers cut their way by gorges



Peru. Map of the Andean republic, at one time the most important Spanish colony in South America

through the E. Cordillera, namely, the Marañon, which is the main stream of the Amazon, the Huallaga, and the Ucayali, which rises not far from Cuzco, and receives many affluents in its long course N. The long navigable stream of the Javary forms the Brazilian boundary through most of its course. Among the other rivers is the Madre de Dios.

Inhabitants and Language

The people of Peru are partly of Indian, partly of Spanish descent, with some admixture of negro or African blood. More than half are pure Indians; about 14 p.c. are white or reputed white, about 25 p.c. are mestizos of mixed European and Indian blood. Japanese and Chinese labourers and traders form a small but valuable proportion, about 2 p.c. The rest of the population consists of various blends of white, negro, and Indian elements. The whites or reputed whites, many of whom have traces of African or Indian blood, form a dominant class, supplying the official and professional ranks.

The peasantry, villagers, and labourers of the sierra, known as

cholos, are pure Indians, a gentle, somewhat apathetic and melancholy race. They still speak Quichua, the language of the Incas. The Aymará language also survives; but on the sierra most of the Indians know something of Spanish. Small and scattered tribes of uncivilized Indians inhabit the recesses of the *montaña*.

The capital and largest town is Lima (q.v.). Callao, the port, linked with Lima by rail and tramway, has about 35,000 inhabitants. Arequipa, situated on the S. uplands but connected with the coastal region, has about the same. Other towns of note are the seaports Mollendo and Payta, Trujillo in the N. near the coast, Cuzco and Ayacucho in the sierra, and Iquitos on the Amazon.

GOVERNMENT. Peru has a centralised or unitary government of the usual S. American type, a president ruling for 4 years with a cabinet of 6 ministers, a senate of 57 members, and a representative house of 128, both elected upon a very restricted franchise. One-third of each house retire every two years. The country is divided into

22 departments, which are subdivided into provinces; but local administration is much controlled by the central executive. The state religion is Roman Catholic, but all religions are tolerated. The small standing army, with a considerable reserve, is maintained by conscription. There is a gold monetary standard: the Peruvian pound, normally equal to the £ sterling, is divided into 10 soles. Lima has the ancient university of San Marcos, founded in 1551. There are also universities at Arequipa, Cuzco, and Trujillo.

Mineral Wealth

The name of Peru is traditionally identified with wealth in the precious metals, particularly silver. Great mineral wealth still issues from the Andine plateau, principally copper. Next in value among minerals comes petroleum from the N. coastal zone; silver from the Andes ranks third. But the vegetable products far exceed the minerals in value, notably sugar, cotton, and coffee. Guano, once a prolific source of wealth and revenue, is still gathered in reduced quantities. There is a considerable export of alpaca and vicuña wool. There are deposits of coal, still untouched, in various parts.

In the coastal zone the natural and most convenient transport is by sea; about 25 ports, most of them mere villages with open roadsteads, serve this coastal traffic. Callao, the chief port of external trade, is situated on a spacious sheltered bay and possesses fine modern docks and wharves. Mollendo, the second port, has little more than a roadstead, but port works are projected. Payta, in the N., possesses a fine natural harbour. A number of short railways link seaports with centres of production or distribution.

The Andine plateau has access to the sea by two mountain railways. One of these, the Callao-Oroya line, traverses a pass in the W. Cordillera higher than the summit of Mont Blanc, and descends thence about 3,000 ft. to Oroya, which is linked by a N. extension to the great copper mines of Cerro de Pasco. Another extension passes S. to Huancayo, and is meant to be continued through Ayacucho to join the Southern Railway at Cuzco. The Southern Railway mounts from Mollendo to Arequipa, and thence over the W. Cordillera to the N. shore of L. Titicaca at Puno, whence steamers connect it with the Bolivian railway system. A N. extension joins Puno with Cuzco. These two mountain railways, with their extensions, together traverse about 900 m. But

much of the transport on the sierra is still carried by troops of llamas driven by Indians.

The montaña depends mainly on river transport. The river port of Iquitos, 2,300 m. from the sea, is visited by ocean steamers. Large river steamers navigate great stretches of the Amazonian affluents; and it is impossible to estimate the immense extent of streams navigable by smaller craft and motor-boats. But vast intervening regions of the montaña are still destitute of transport. The construction of a rly. from the central plateau to the navigable waters of the montaña was being discussed in 1921 when the route followed narrow mule-paths bordering ravines and precipices.

Economic progress in the past has been much impeded by civil disturbances and external wars. During the Great War the high profits obtained by exporting copper, sugar, and cotton brought a wave of commercial prosperity, but the country has suffered later from the universal economic crisis.

F. A. Kirkpatrick

ARCHAEOLOGY. The material remains of pre-Columbian Peru pertain to a wide geographical region dominated by the Aymará and Quichua peoples. It embraced N.W. Argentina and Bolivia, besides impinging in N. Chile on the Araucanian and in Ecuador on the Chibcha region.

Before our era the Yunca, or rainless and stoneless coastal valleys, were occupied by fishing tribes, whose vast shell-mounds have yielded their bone implements and basketware. There came among them, traditionally from the sea—whether from middle America, the W., or both, is undetermined—an agricultural people who erected truncated pyramidal mounds of adobe for burial and for the platforms of residential structures. The N. section, round Trujillo, called early Chimu, is marked by pottery moulded into human, animal, and vegetable forms. The S. section, called early Nasca, is marked by pottery with painted decoration.

Peoples of the Uplands

In the well-watered Andean uplands, amply supplied with stone, arose another agricultural people, who domesticated the llama for transport and the alpaca for wool. Using stone tools, they set up remarkable megalithic structures, notably at Tiahuanaco near Lake Titicaca, in the Cuzco valley, and at Ollantaytambo, which guarded the Amazons pass. To this archaic period succeeded a new artistic outburst which, down to the 8th century, intermingled with the coast

cultures. It was marked by stone carving, weaving, and goldwork, and a southward migration produced the Diaguite or Calchaqui culture of N.W. Argentina.

The remnants of one of the megalithic dynasties, apparently under pressure from the coast, took refuge in a fastness called Tampu-Tocco, identified by Bingham in 1911 with Machu-Picchu in the Urubamba valley. Besides cyclopean remains this site yielded pictographic stones, showing that an undeveloped system of record preceded that of the later quipus or knotted cords. By about 1100 the Inca tribe, perhaps emerging from Tampu-Tocco, began to dominate the highlands, while the later Chimu and Nasca cultures on the coast independently reached a new zenith of their own, before being absorbed into the Inca empire.

Megalithic Remains

The most imposing megalithic remains are at Tiahuanaco. At Sillustani on Lake Umayo are numerous burial-towers or chullpas, and stone circles. From Chavin de Huantar, in the Marañon valley, came a diorite stela 25 ft. high, sculptured to represent a deity. The Inca builders used smaller blocks for their edifices, which were sometimes many-storied, as on the islands in Lake Titicaca and at Pachacamac. At Marca Huamachuco are extensive llama-corral; at Huanuco Viejo a series of stone baths. The Inca constructed stone aqueducts and bridges, terraced hillsides for cultivation, and paved highways throughout the empire.

The dead were desiccated and enveloped in cotton wrappings or llama skins, called mummy-packs. On the coast occur pyramidal mounds with underground passages to store-chambers and tombs, once holding vast hoards of gold. The grave-deposits, notably at Ancon, comprise the same variety of domestic objects as in Egypt. Simple weaving implements, employed for cotton, a sisal-like fibre, and alpaca wool, produced tapestry with bold animal designs. Metalwork included gold and silver goblets and breastplates, and copper ornaments, implements, and tools.

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E. G. Harmer

HISTORY. The Incas during four centuries of domination, by a process of elaborate and steady conquests had brought under their sway an empire measuring more than 1,500 m. from N. to S.,



1. Decoration from ancient terra-cotta vessel. 2. Earthenware musical instrument. 3. Figure in pottery of man playing a flute. 4. Pottery figure of an official, probably a portrait. 5. Pottery head, full face. 6. Pottery head, profile. These four figures illustrate the skill with

which the ancient Peruvian craftsmen portrayed features. 7. Stone seat from Loja, Ecuador. 8. Earthenware trumpet. 9. Inca water carrier from Cuzco. 10. Natives of the Yucay Valley. 11. Present-day Indians in dress similar to that worn in the Inca period

PERU: RELICS OF THE PAST, AND PERUVIANS OF THE PRESENT DAY

and comprising approximately the present territories of Bolivia, Peru, and Ecuador. The Inca conquest of Quito in the 16th century, and the death of the conqueror, were followed by a destructive civil war between the rightful heir, Huascar, and his half-brother, the usurper Atahualpa. Thus the distracted state of the country partly accounts for the fact that a polity so extensive and apparently so well organized fell before a handful of Spanish adventurers. After seven years of preliminary effort and exploration, and after suffering indescribable hardships, Pizarro (q.v.) landed at Tumbez in 1531; he advanced into the interior, treacherously put to death Atahualpa, and in 1533 entered the capital Cuzco. In 1535 he founded the present capital, Lima. Notwithstanding some later native attempts at resistance, favoured by quarrels among the Spanish conquerors, the Inca empire had fallen, and about the middle of the 16th century the authority of the Spanish viceroy was established.

For two centuries the history of Peru was virtually the history of Spanish S. America. For the viceroy, installed at Lima, not only ruled his own viceroyalty, comprising the present territories of Bolivia and Peru, but also held authority over almost all the Spanish governors upon the continent.

The seat of the viceroy, Peru itself had a less agitated and eventful history than the other "kingdoms" of S. America. The interest of its history is mainly concerned with administration and finance; for it was the viceroy's duty to transmit to Spain the royal share of the precious metals mined in Peru, particularly in the silver mines of Potosi (now in Bolivia). In the course of the 18th century many reforms were made, and two new viceroyalties, in New Granada and in Buenos Aires, were set up, independent of Peru. In the year 1780 a serious native revolt shook the viceroyalty. The revolt was suppressed by loyal Indians under Spanish officers, and was followed by barbarous executions.

End of Spain's Dominion

During the revolutionary movements in other parts of the continent from 1810-22, Peru was the stronghold of Spanish authority. Indeed, royalist expeditions sent from thence drove the Argentine invaders from Upper Peru (now Bolivia), and reconquered Chile. However, in 1820 an army and fleet, under San Martin and Cochrane, invaded Peru from Chile, and in 1821 San Martin entered Lima, and proclaimed himself protector

of Peru. But the war continued for three years longer. Lima for a time was reoccupied by the royalists, and it was not until 1824 that the battle of Ayacucho finally ended the Spanish dominion in S. America.

For three years Peru recognized the authority of Bolivar, "the Liberator"; upon his departure, in 1826, the republic entered upon the stormy career characteristic of tropical republics of mixed blood, presidents and dictators succeeding one another with bewildering rapidity. In 1836 the attempt of the Bolivian, Santa Cruz, to unite Bolivia and Peru under his dominion led to war with Chile. From 1845-62 the domination of Ramon Castilla brought comparative tranquillity, better administration, and economic progress. But after him the old disorders recurred, and trouble with Chile over frontiers was deferred by war with Spain (1864-66).

War with Chile

The frontiers of Peru, Bolivia, and Chile in the coastal desert were not a burning question until it was discovered that the desert might yield great wealth, first in the form of guano, and then in that of nitrate, and this led to the war between Chile and the allied republics of Peru and Bolivia. The victorious Chileans occupied Lima for nearly three years, and in 1883 imposed the peace of Ancón, whereby Chile annexed the province of Tarapacá, and also occupied the provinces of Tacna and Arica, with the promise that their ultimate destiny should be decided by a plebiscite. The plebiscite has not been held, and the two provinces remain in Chilean occupation.

The war was a severe blow to Peruvian prosperity, and political disorders rendered recovery more difficult. Indeed, revolutionary movements have not been quite unknown, even in the present century. Yet Peru has distinctly shared the general South American movement of consolidation and settlement. In the Great War the republic was driven by German attacks on shipping to break off diplomatic relations with Germany, seize the German ships at Callao, and open the Peruvian ports to the allies. Thus Peru is one of the signatories of the treaty of Versailles.

P. A. Kirkpatrick

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Peru. City of Illinois, U.S.A., in LaSalle co. It stands on the Illinois river at the head of navigation, 60 m. N.N.E. of Peoria, and is served by the Chicago, Rock Island, and Pacific and other rlys., and by the Illinois and Michigan canal. It contains S. Bede College for R.C.'s, the Masonic Temple, Turner Hall, etc. Its industrial establishments include zinc rolling-mills, foundries, machine shops, and plough and wheel factories. Bituminous coal is worked in the neighbourhood. Peru was settled in 1827, and incorporated in 1845, and became a city in 1851. Pop. 8,900.

Peru. City of Indiana, U.S.A., the co. seat of Miami co. It stands on the Wabash river, 75 m. N. of Indianapolis, and is served by the Wabash and other rlys. There are rly. workshops and motor-car and other works. Peru was settled in 1835, incorporated in 1848, and chartered in 1868. Pop. 12,400.

Peru, BALSAM OF. Liquid exuded from the trunk of *Myroxylon Pereira* of Central America, after beating and scorching the bark. It is used in medicine to stimulate the gastric secretions in some forms of dyspepsia, and also as an expectorant in chronic bronchitis.

Perugia. Prov. of central Italy, co-extensive with the compartment of Umbria. Mainly mountainous, being traversed by the Apennines, it is watered by the Tiber and affluents, and contains Lake Trasimeno. The mountains yield iron, coal, and marble, while the valleys produce wheat, olives, and grapes. Much wine and olive oil are produced. In comparison with other provinces it is sparsely inhabited. Area, 3,770 sq. m. Pop. 714,700. See Umbria.

Perugia (anc. *Perusia*). City of Italy, capital of the prov. of Perugia. It is picturesquely placed on hills at an alt. of 1,705 ft. overlooking the Tiber, 10 m. E. of Lake Trasimeno - or Lago di Perugia, and 126 m. by rly. N. of Rome. Irregular in plan, its medieval walls enclose separate hill tops. There are remains of the Etruscan terraced walls, gates, and tombs.

The 15th century Gothic cathedral of San Lorenzo, adorned with fine paintings and carvings, is still unfinished. Among many interesting churches is that of San Pietro, a curious edifice founded about 1000, rich in masterpieces by Perugino and others. The university, founded 1307, houses a collection of Etruscan and Roman antiquities, and a library. The great Gothic municipal palace (1281-1333) has a valuable collection of pictures by Umbrian masters. In

the cathedral square are a large fountain, a statue of Pope Julius III, and the money changers' hall (1453), with beautiful frescoes by Perugino. There are also an academy, a school of art, a public library, a botanical garden, and an observatory. The manufactures include liqueurs, silk and woollen goods, while a trade is carried on in corn, fruit, wine, and oil.

Perugia was one of the twelve cities of Etruria. It was captured by the Romans in 309 B.C., was destroyed by Octavian in 41 B.C., in the so-called Perusine war against Lucius Antonius, and again destroyed by Totila, A.D. 549. For 13 centuries it was more or less subject to the popes, and was annexed to the dominions of Victor Emmanuel in 1860. Pop. 70,200. See History of Perugia, W. Heywood, ed. R. Langton Douglas, 1910.

Perugino OR PIETRO VANNUCCI (1446-1524). Italian painter. Born at Città della Pieve, he studied



Perugino,
Italian painter
Self-portrait

at Perugia and in the school of Verrocchio at Florence. He worked in Florence and Perugia till 1480, when he was employed by Pope Sixtus IV on the decoration of the Sistine chapel and other portions of the Vatican; when he returned to Florence about 1493, Raphael became his pupil. He was among the first of the Italians to use the oil medium successfully, though he painted also in tempera, and his graceful figures, with their poetic landscape background, procured him a wide reputation. He died at Fontignano, near Perugia. There are five works by him in the British National Gallery. See Pietro Vannucci called Perugino, G. C. Williamson, 1910.

Peruke. Artificial head of hair, a variant of periwig. See Wig.

Peruvian Bark. Former name for the bark of various species of *Cinchona* imported from Peru and Bolivia for the sake of the quinine contained in it. The story of its discovery, and of the subsequent introduction of the trees into India, is told under Bark (*q.v.*). The species yielding the highest percentage of quinine is *C. calisaya* and *C. ledgeriana*, known as yellow barks. Red bark (*C. succirubra*) is the species that has been grown most extensively in the Himalayas, the Nilgiris, and Java, but it is now being superseded by replanting with the richer yellow barks.

See Cinchona; Markham, Sir Clements.

Peruvian Gooseberry (*Physalis peruviana*). Herb of the order Solanaceae, known also as Cape gooseberry and Peruvian winter cherry. See Cape Gooseberry.



Perugia, Italy. Palazzo del Municipio, built 1281-1333. On the right is the 13th century Maggiore fountain; top, right, Porta Urbica Etrusca, one of the gates of the city

Peruvian Mastic Tree. Californian pepper-tree (*Schinus Molle*). Small fragrant tree of the natural



Peruvian Mastic Tree. Leaves and flowers

order Anacardiaceae, native of Brazil and Peru. The alternate leaves are divided into many pairs of lance-shaped leaflets with toothed edges. The small, yellow-green flowers are clustered and succeeded by pea-like, rosy fruits of an oily nature. The resinous sap that gives its fragrance to the tree is used by the Peruvians as an astringent

for the gums, and the root is used medicinally.

Peruzzi, BALDASSARE (1481-1536). Italian architect and painter. Born near Siena, he studied probably under Pacchiarotto. He worked at Siena as a painter without obtaining eminence, and then went to Rome,

where he built the Villa Farnesina for Agostino Chigi. This success induced him to devote himself to architecture, and in 1520 he was appointed architect to S. Peter's. After the sack of the city in 1527, when he was plundered of his possessions, he fled to Siena, where he became city architect, was employed on the fortifications, and was given a pension. He died in Rome, Jan. 6, 1536. *Pron.* Perootsy.

Pervyse. Village of Belgium, in the prov. of W. Flanders. It lies 4½ m. S. of Nieuport, on the line of the Nieuport-Dixmude rly. It was important in the resistance of the French Fusiliers Marins against the German attacks on the Yser front, 1914, and later was part of the front held by the Belgian army. It was severely damaged by bombardment. Here in 1914-18 Mrs.



Pervyse, Belgium. The ruined main street after bombardment in the Great War

Knocker (later Baroness de T'Serclaes) and Miss Marie Chisholm established a Red Cross centre to aid the Belgians. Their experiences were recounted in *The Cellar House* of Pervyse, ed. G. E. Mitton, 1916. See Ypres, Battles of Yser, The. *Pron.* Pairveez.

Pesaro. City of Italy, the capital of the prov. of Pesaro e Urbino. It stands on the river Foglia, near its mouth in the Adriatic Sea, 37 m. by rly. N.W. of Ancona. The old cathedral, now closed, has a 12th century mosaic pavement, and the new one has a famous picture by Bellini. The prefecture was built in the 15th century for the Sforzas, whose fortress (1474) remains. The museum contains a rich collection of art pottery, furniture, etc. The conservatoire was founded by Rossini, a native of the city. A noteworthy feature is the old Roman bridge which spans the Foglia. Manufactures include silks, woollens, majolica, glass, iron, and sealing-wax, and Pesaro is noted for its figs, which are exported in large quantities. Founded as Pisaurum by the Romans in 184 B.C., it was destroyed by the Goths and restored by Belisarius. Pesaro was a papal possession in the 8th century, and was later ruled by the houses of Malatesta, Sforza, and Rovere, falling again to the popes from 1631 to 1860. Pop. 28,500. *Pron.* Pezz-aro.

Pesaro e Urbino. Prov. of N.E. Italy, in the Marches. It extends from the Apennines to the Adriatic Sea, and its area is 1,118 sq. m. A mountainous prov., its fertile valleys produce grain, fruit, wine, and oil. Iron is mined and silk manufactured. Pop. 270,700.

Pescadores OR **FISHERS' ISLANDS.** Group of islands belonging to Japan. Situated in Formosa Strait, between the island of Formosa and the mainland of China, it consists of some 20 inhabited islands and a number of uninhabited rocks, all of basaltic formation, and low-lying. It covers an area of nearly 50 sq. m., and has a pop. of more than 50,000. The soil is fertile, and produces rice, millet, and other cereals. Navigation is extremely dangerous. A possession of China down to 1895, when it was ceded to Japan, the group is officially called Hokoto by the Japanese, and is known to the Chinese as Pang-hu or Peng-hu.

Pescara. River and town of S. Italy, in the prov. of Abruzzi e Molise. The river rises in the Apennines as the Gizio and Aterno, which unite just above Popoli. Below this town the river flows across the prov. N.E. to the Adriatic coast. At its mouth is an

hydraulic electricity power station for the supply of Rome. The town is at the mouth of the river on the coast, 8 m. N.W. of Chieti. It has a fortified harbour and is a sea bathing resort. Pop. 3,600.

Pescara, FERNANDO FRANCESCO D'AVALOS, MARQUIS OF (c. 1490-1525). Neapolitan soldier. He entered the service of the emperor Charles V, and fought in the wars with the French. He took part in the battle of Ravenna, 1512, at which he was taken prisoner, and in the battle of Pavia, 1525, after which he was made commander-in-chief in Italy. He died Nov. 4, 1525. His wife was Vittoria Colonna (*q.v.*).

Peschiera. Town of Italy, in the prov. of Verona. It stands on the river Mincio, where it issues from the Lago di Garda, 20 m. N.N.W. of Mantua. One of the famous fortresses of the Quadrilateral (*q.v.*), it was captured from the Austrians by the Sardinians, May 30, 1848. Pop. 3,000. *Pron.* Pesky-aira.

Pescia. City of Italy, in the prov. of Lucca. It is 28 m. by rly. W.N.W. of Florence. The cathedral, restored in 1693, has a 13th century façade and pulpit, and a fine monument to Baldassare Turini. Paper-making and silk manufacture are the leading industries, and there is trade in oil, wine, and fruit. Pop. 18,000. *Pron.* Pesh-ya.

Peseta. Spanish silver coin. The monetary unit of Spain, its nominal value is about 9½d. It is divided into 100 centimos and coined in ½, 1, 2, and 5 peseta silver pieces, and 5, 10, 20, and 25 peseta gold pieces.

Peshawar. Capital of the N.W. Frontier Province, India, and one of the British districts of the prov. The dist. is a hill-girt basin, W. of the Indus, drained by the Kabul river and its tributaries, the Swat

and Bara. Wheat is the chief crop. Half of the people are Pathans. The rly. follows the Kabul valley from Attock on the Indus to Peshawar, and thence to Jamrud, and a branch goes N. to Dargai at the foot of the Malakand Pass. The Lower Swat, Bara river, and Kabul river canals provide the necessary irrigation water. Its area is 2,611 sq. m. Pop. 865,000.

The town lies near the Bara, 190 m. from Kabul and 276 m. from Lahore. It occupies a strategic position in relation to the Khyber Pass, 10½ m. to the W., into Afghanistan, and is a great trade centre for raw silk and fruit, gold and silver lace and thread, silk and cotton goods, sugar, tea, etc.

A broad-gauge rly. joins the town with Jamrud to the W., with Campbellpur Junction, E. of the Indus. At Campbellpur connexion



Peseta. Obverse and reverse of the Spanish silver coin. Diameter 1½ in.

is made with the two great rlys. of N.W. India, the line parallel and close to the Indus and the line through Lahore and Ambala to Lucknow and Calcutta.

Peshawar was a Buddhist capital in the 2nd century, and a great resort of Chinese pilgrims in the 5th, 6th, and 7th centuries. From the 8th century, when the Afghans first reached the district, it has been a debatable ground. Mahmud in the 11th century made it a base of operations against N.W. India. Under Jahangir and his successors Peshawar was subject to Delhi; it has been British since 1848. Pop. 98,000. *Pron.* Pesháh-wer.



Peshawar, India. General view of the capital of the N.W. Frontier Province

Peshwa (Persian, leader). Title of a Maratha chieftain. Originally applied to the chief adviser or prime minister, after the usurpation of supreme power by one of these ministers, it was given to the raja of Poona. The last Peshwa was Baji Rao, deposed by the British in 1818. *See* Maratha.

Peso (Lat. *pensum*, weight). Coin used in several countries of S. and Central America. Argentina,



Peso. Silver coin used in Guatemala. Half actual size

Chile, Uruguay, Panama, Paraguay, Honduras, Salvador, Colombia, and Guatemala have each a silver coin of one peso, which is divided into 100 centavos or other similar unit. The first peso was a Spanish coin, coined both in gold and silver, which circulated in Spain and her colonies. The Mexican dollar is also called the peso. *Peseta* is a diminutive.

Pesquet's Parrot (*Dasyptilus pesqueti*). Fruit-eating parrot of the family Nestoridae. It is a native of New Guinea, where it is found at considerable altitudes, flying in pairs or small flocks. The black face and throat are nearly bare of feathers. The upper parts are black, except the wings and tail coverts and a band on each side of the back of the head, which are red; the under parts also are red. Its cry is loud and harsh. *See* Kea; Parrot.

Pessimism (Lat. *pessimus*, worst). In general, the tendency to look on the worst side of things; in philosophy, the doctrine that life and existence are fundamentally evil. From a religious point of view it reaches its extreme in Buddhism. Its chief modern representatives are Schopenhauer and von Hartmann. All satisfaction of our needs is illusory, and only leads to new needs and consequent grief; the best thing is to take no interest in life. According to Hartmann, the unconscious leads us in a direction contrary to our own interests. Progress only makes us more sensible of pain, which is part of our existence. Pleasure is only negative, pain positive. *See* Pleasure; consult also *Le Pessimisme au 19e Siècle*, E. M. Caro, 1878; *Pessimism: a History and Criticism*, J. Sully, 2nd ed. 1891; *Studies in Pessimism*, A. Schopenhauer, Eng. trans. T. B. Saunders, 4th ed. 1893.

Pestalozzi, JOHANN HEINRICH (1746-1827). Swiss educationist. Born at Zürich, Jan. 12, 1746, and educated at the university there, he became interested in social and educational reform. In 1780 he cultivated a madder farm, and kept a school for waifs and strays at Neu-hof, in canton Aargau, and during this period wrote *The Evening Hours of a Hermit*, 1780, and the immensely successful moral tale, *Leonard and Gertrude*, 1781. From 1798-99 he conducted a school at Stanz, on the Lake of Lucerne, for the accommodation of children rendered homeless and orphans by the French invasion of Switzerland. From 1799 to 1825 he kept a school first at Berthoud and then at Yverdon, where he put into practice his educational theories, which are based on the idea that understanding is only possible by that



J. H. Pestalozzi, Swiss educationist



Henri Philippe Pétain, commander-in-chief of the French armies, March-November, 1918

spontaneous perception which is a result of observation. These views he expounded in *How Gertrude Teaches Her Children*, 1801. He died Feb. 17, 1827. *See* Education.

Pestilence (Lat. *pestilentia*, an infectious disease). Term used for any infectious deadly disease. *See* Black Death; Plague.

Pestle (Lat. *pinsere*, to pound). Instrument for pounding anything in a mortar. A pestle and mortar is an apparatus by which substances are crushed or mixed by chemists, colourmen, etc. The

pestle may be club-shaped or conical with a flat base, constructed of stone, quartz, porphyry, metal, etc., and held in the hand to operate upon a substance contained in the mortar, which is cup-shaped and usually formed of similar material to the pestle and of substantial thickness.



Pestle and mortar

Pétain, HENRI PHILIPPE (b. 1856). French soldier. Born at Cauchy-à-la-Tour, Pas-de-Calais, April 24, 1856, he entered the military school of St. Cyr in 1876, passing out as a sub-lieutenant of infantry in 1878. After rising to the rank of major, he was given command of a battalion, and became instructor at the musketry school at Châlons in 1902. Assistant instructor at the school of war under Foch in 1906, he was promoted colonel in 1912, when he commanded the 33rd regiment of infantry at Arras. At the outbreak of the Great War he was in command of the 4th brigade. Later he commanded the 33rd corps around Arras, and was engaged in the operations in Artois, 1915.

As commander of an army in Sept., 1915, he participated in the offensive in Champagne, and in Feb., 1916, was placed in command of the defences of Verdun, where he showed brilliant generalship. Given command in Dec. of all the armies of the centre, he later became chief of the staff, and in May, 1917, succeeded Nivelle as commander of the armies of the north and north-east. In March, 1918, when Foch was made generalissimo, Pétain became commander-in-chief of all the French armies. He was made a marshal of France, Nov. 19, 1918. *See* Nivelle, Robert; Verdun.

Petal (Gr. *petalon*, thin sheet of metal). In a flower, the inner series of floral leaves, as distinguished from the outer series. They are usually of a much more delicate texture than the outer series (sepals), and white or coloured instead of green. Collectively the petals are referred to as the corolla of the flower. They may be quite separate one from another (poly-petalous corolla), or variously united to form a tube, a funnel, a bell, etc. (gamopetalous corolla). The petals are usually the most conspicuous parts of the plant, their purpose being the attraction of nectar-seeking insects to assist in the work of pollination. With this object in view the petals are frequently streaked with some stronger tint. *See* Flower.

Petard (Fr. *péter*, to make an explosion). Military engine, now obsolete. It consisted of a small metal or wooden case, shaped like a half-cone, and filled with gunpowder. It was used to make a breach in a wall, or to blow in a gate when attacking a fortress. The usual procedure was to fasten it against a door or wall or any other obstacle, and then to fire it with a fuse. The man in charge of a petard was called a petardier. Its modern equivalent is the mortar (q.v.). Shakespeare, in *Hamlet*, act iii, scene 4, coined the phrase, "Hoist with his own petar."

Petchenegs OR PATZINAKS. Nomadic Turkish people. Advancing from the Ural about 840, they drove the Magyars before them into Hungary, 895. In the 10th century they ruled from the Volga



Saint Peter the Apostle, from a plaque by Luca della Robbia in the church of S. Croce, Florence

to the Danube, became Mahomedans, broke the power of the Chazars, and harassed the Russians. Driven from S. Russia by the Kumanians about 1047, they maintained their power in what is now Rumania until about 1100.

Petchenga. Seaport of Finland. An ice-free port on the Arctic Ocean, it was ceded by Norway to Russia in 1826, but passed under Finnish control in 1864. It was acquired by Finland from Soviet Russia under the Dorpat peace treaty, 1920. See Finland; N.V.

Petchora. River of N.E. Russia. It rises in the W. of the Urals, flows in a generally N.W. direction through forests and along the steppes, and discharges itself into the Bay of Petchora in the Arctic Ocean. Its length is about 1,000 m.

Peter. Masculine Christian name. It comes from a Greek word meaning stone, and became popular throughout Christendom because it was that of one of the leading

apostles of Jesus Christ. The French form is Pierre, and the Italian Pietro. The Spanish form is Pedro, and under that form the

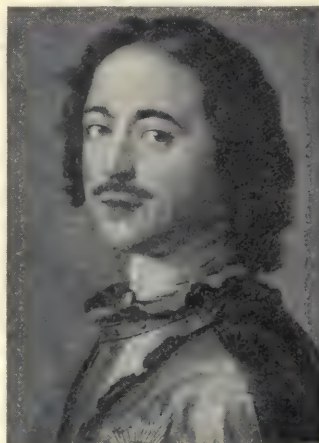


Petard. Example of use of the ancient military engine, from a print of c. 1579

Spanish and Brazilian sovereigns appear in this work.

Peter. One of the twelve apostles. A son of Jonas, apparently a native of Capernaum, he was in partnership with his brother Andrew as a fisher on the lake of Galilee when called to be an apostle. Previously, perhaps, a disciple of John the Baptist, and originally called Simon, he received the name of Cephas or Peter from Christ, who, in reference to the meaning of the name, declared that on this rock He would build His Church. With James and John, Peter became one of the inner circle of the apostles.

Of impetuous character, eager and generous in disposition, he was a born leader of men. After the Resurrection, Christ appeared to him and gave to him the charge, Feed My sheep. He preached the first sermon after the great Pentecost, and was the first to admit a Gentile to the Christian Church. He left Antioch, where he had been working, after his dissension with S. Paul, and is believed to have preached throughout Asia Minor, to have gone to Rome, and to have met death by crucifixion, perhaps



Peter the Great, Tsar of Russia
After J. M. Nattier

under Nero, A.D. 68. See Brown, Ford Madox; Christianity; Jerusalem; Papacy.

Peter, EPISTLES OF. Two books in the New Testament, written by S. Peter. Several works have survived which were ascribed to the apostle, but were not in reality his. Examples of these are the apocryphal Gospel of Peter, the Preaching of Peter, and the Apocalypse of Peter. The question naturally arises, therefore, whether the Epistles of Peter have been rightly ascribed to him. They claim in the first verse to be written by the apostle. This claim for the First Epistle is supported by adequate external evidence. The Epistle is quoted by Polycarp and seems to have been known to Barnabas, Clement of Rome, and Papias. Its authenticity is accepted by Irenaeus, Tertullian, Origen, and Eusebius.

As for internal evidence, it has been objected that many of the ideas are Paul's rather than Peter's; that one would expect from Peter more personal reminiscences of the life of Jesus; and that the persecution referred to in iv, 14-16 indicates a date later than Peter's death. The first and second objections are not vital. As regards the third, there were no doubt persecutions before the official imperial persecution of A.D. 64.

The Petrine authorship, therefore, may well be accepted, and we may conclude that the Epistle was written from Rome before A.D. 64. The external evidence for the Second Epistle is very weak. It is not included in the Muratorian Canon, or even in the old Latin and Syriac versions. It does not seem to have been used by the earliest Christian Fathers; its authorship is doubted by Origen, and it is placed by Eusebius among the disputed books. Probably the Second Epistle was written by a disciple of Peter in his master's name. See Bible; New Testament.

Peter I, THE GREAT (1672-1725). Tsar of Russia. Son of the Tsar Alexis, he was born May 30, 1672, and succeeded to the tsardom jointly with his elder brother, Feodor, in 1682. Young Peter was trained by the Swiss, Lefort, and the Scot, Patrik Gordon.

In 1689 he effected a *coup d'état*, overturning the regency of his sister Sophia, though without officially deposing his brother. Peter, a born barbarian but at the same time a genius, was imbued with the three conceptions of organizing his vast dominion after W. models, of impregnating it with W. culture, and of extending its borders to the Baltic Sea on the N. and the Black

Sea on the S. His first task was a military reconstruction directed by Patrick Gordon. A war with Turkey gave him the port of Azov, 1696, and the opportunity for creating a Russian navy. His next step was to dispatch a number of scions of noble families to observe and study the manners and methods of W. Europe. He followed this up in 1697 by himself making the great tour, visiting European courts and working with his own hands in the shipyards of Holland and England. He returned to Russia to complete the suppression of a revolt raised by the party hostile to western innovations, and he brought with him engineers, artisans, and scientists.

In 1699, after the accession in Sweden of Charles XII (*q.v.*), he formed a coalition with Poland and Denmark for a partition of the Baltic provinces of Sweden, which should establish Russia on that sea. Charles, however, crushed Denmark, shattered Peter's huge army at Narva (*q.v.*), and then turned on Poland. Peter was left at leisure to found his new capital of Petersburg, and to apply the lessons of Narva to the organization of his army. When Charles again turned upon Russia, he was drawn deep into the country, and his army was annihilated at Poltava in 1709, though he himself escaped over the Turkish border and presently induced Turkey to declare war upon Peter. In the course of the war the tsar, with his army, was enticed into a trap, and would have been annihilated but for the diplomatic skill of his mistress—afterwards his wife and his successor—Catherine, who procured a treaty by which Peter gave up Azov.

He now made himself master of Finland, and after the death of Charles imposed upon Sweden a peace which transferred to Russia the Baltic provinces which Peter desired in 1721. A S.E. expansion at the expense of Persia was his next project, which carried the Russian borders to the Caspian and the Caucasus; but his further ambitions were stayed by his death, Jan. 28, 1725. He was succeeded on the throne by his widow, Catherine I, whom he had married in 1712.

Bibliography. History of the Russian Empire under Peter the Great, F. M. Voltaire, Eng. trans. 1763; Peter the Great, K. Waliszewski, Eng. trans. M. Loyd, 2nd ed. 1898; History of Russia from Peter the Great to Alexander II, W. R. Morfill, 1902.

Peter II (1715–30). Tsar of Russia. Son of Alexis, the only son of Peter the Great, he was born

Oct. 11, 1715, and succeeded Catherine I in 1727. He fell under the influence of Menshikov, one of whose daughters he married, and exiled Anna Ivanovna, duchess of Courland, the legitimate heir to the throne. At the instigation of Ivan Dolgoruki, Peter threw off the yoke imposed on him by Menshikov, whom he exiled to Siberia with his family. He died Jan. 29, 1730.



Peter II,
Tsar of Russia

Peter III (1728–62). Tsar of Russia. Born at Kiel, Jan. 29, 1728, he was the son of Anne, eldest daughter of Peter the Great. He ascended the throne Jan. 5, 1762, and immediately reversed Russian policy by concluding a peace with Frederick II



Peter III,
Tsar of Russia

of Prussia. Never a favourite with his subjects, he was the victim of a plot not unknown to his consort, who proclaimed herself empress as Catherine II, July 14, 1762. Peter was strangled a few days later.

Peter (1844–1921). King of the Serbs, Croats, and Slovenes. Son of Alexander I, prince of Serbia, 1842–58, Peter Karageorgevitch was born at Belgrade, July 11, 1844. Exiled with the rest of the family, he received a military education at St. Cyr, and fought with distinction in the foreign legion during the Franco-Prussian War, and in 1875 as a leader of the Herzegovinian insurgents. He married, in 1883, Zorka, daughter of Nicholas I of Montenegro.



Peter,
King of the Serbs

On the extinction of the Obrenovitch dynasty by the assassination of King Alexander Obrenovitch, June 10, 1903, Peter was elected king by the National Assembly on June 15. He was not in a strong enough position to deal justice to the murderers of his predecessor, and the new monarchy was not recognized by Great Britain until 1906. In June, 1914, he committed the regency of the kingdom to the

crown prince Alexander, his second son, but was with the army during the first part of the Great War, accompanying it in the retreat of 1915–16 to Greece, where he spent his second exile. On the reconquest of Serbia and its extension into the kingdom of the Serbs, Croats, and Slovenes, known as Yugo-Slavia, Peter returned to Belgrade, where he died Aug. 16, 1921. See Karageorgevitch; Serbia; Yugo-Slavia; consult also Pierre I, roi de Serbie, R. Chambry, 1917.

Peter the HERMIT. Medieval preacher, known for his connexion with the first crusade. Little is known of him save that he was a priest at Amiens when Pope Urban II, in 1095, declared a crusade. Peter was one of the most successful of the wandering preachers who went through France urging its claims. He led one band of crusaders from Cologne to Constantinople, and after some vicissitudes reached the Holy Land. He is said to have died in 1115. The medieval writers ascribe to Peter a larger share in originating the crusade than was actually the case. See Crusades.

Peterborough. City and mun. borough of Northamptonshire, England. It stands on the Nene, 76 m. from London, and is served by the G.N., Midland, G.E., and L. & N.W. Rlys., being an important rly. centre. The cathedral of S. Peter occupies the site of a Saxon edifice. It was begun about 1118 as the church of a monastery, took over 100 years to build, and contains examples of several styles of architecture. The magnificent west front was restored after 1895. The nave is a noble piece of work, while another feature is the rebuilt central tower. Made a cathedral when a bishopric was established here in 1541, it contains the tomb of Catherine of Aragon. There are some remains of the monastery, including the cloisters, and connected with the cathedral are some interesting buildings, among them two gateways (above one of which is the chapel of S. Nicholas), and the chapel of S. Thomas Becket. Other buildings include the church of S. John Baptist, a 15th century building, the grammar school, town hall, a 17th century edifice, and a museum. The staple industries are the making of railway stock and farm implements. There is a trade in agricultural produce, and



Peterborough
arms



Peterborough, Northamptonshire. West front of the cathedral

bricks are largely made in the neighbourhood. The ancient Medeshamstede, the home in the meadows, Peterborough grew up around a Benedictine monastery founded in 655, and restored after having been destroyed by the Danes. In 1874 it was made a borough on modern lines, having previously had its medieval constitution. It was separately represented in Parliament, 1547-1918, and was given markets and fairs. The diocese covers the counties of Northampton, Leicester, and Rutland, but in 1921 it was proposed to make Leicester a separate see. Market days, Wed. and Sat. Pop. (1921), 35,533. (See Apse.)

The soke of Peterborough, a district around the city, forms a separate county for administrative purposes. It has an area of 83 sq. m., and a pop. of 46,950.

Peterborough, formerly called **PETERSBURG**. Town of Dalhousie co., S. Australia. It is near Terowie, the rly. junction of the line from Broken Hill to Port Pirie, and the main line from Adelaide to Perth. Pop. 2,530.

Peterborough. City of Ontario, Canada. It stands on the river Otonabee, 72 m. from Toronto, is served by the G.T.R. and the incomplete Trent Canal, and has its own electric rly. Its public buildings include a R.C. cathedral, and its industries, lumber and flour mills. Pop. 18,360.

Peterborough, CHARLES MORDAUNT, 3RD EARL OF (1658-1735). English sailor and



3rd Earl of Peterborough

soldier. Son of John, Viscount Mordaunt (1627-75), he entered the navy, 1675, and took an active part in the establishment of William III on the throne. He was rewarded with the post of first lord of the treasury, and the earldom of Monmouth, 1689. In connexion with the Fenwick plot he was kept in the Tower for three months, 1697, and in that year inherited the earldom of Peterborough. In 1705 he shared the command of the Spanish expedition with Sir Cloudesley Shovell. His campaign in E. Spain, including the capture of Barcelona, though represented by himself as brilliantly successful, roused much controversy. Recalled in 1707, he went to Vienna as ambassador in 1710, returning on

the accession of George I in 1714, when his official career ended. He died at Lisbon, Oct. 25, 1735. See Peterborough, W. Stebbing, 1906.

Peterhead. Mun. burgh and seaport of Aberdeenshire, Scotland. It stands on the N. side of Peterhead Bay, 44 m. from Aberdeen, with a station on the G.N. of S. Rly. The burgh consists of two parts, Peterhead proper and Keith Inch, separated by the harbour, which includes graving docks and a large harbour of refuge, built 1886-1921 by prisoners from the convict prison near. The main buildings are the town hall and the museum and art gallery. The chief industry is the herring fishery; another is the polishing of red granite, which is extensively quarried in the neighbourhood, and there are some small manufactures.

Peterhead was long the property of the Keith family. It was founded and made a burgh in 1593 by George, Earl Marischal, and was at one time the headquarters for Scotland of the Arctic fisheries, and had a considerable trade with the Baltic and Mediterranean ports and America. It is the most easterly town of Scotland. - Market day, Fri. Pop. 13,126.

Peterhof. Town of N.W. Russia. It is in the govt., and 15 m. S.W., of Petrograd, with which it is connected by railway, on the S. shore of the Bay of Kronstadt. Founded in 1711 by Peter the Great, it is celebrated for its château, formerly a favourite summer residence of the tsars. Pop. 16,000.

Peterhouse OR **S. PETER'S COLLEGE**. Oldest of the Cambridge colleges. It was founded in 1257 by Hugo de Balsham, bishop of Ely, on the lines of Merton College, Oxford; its charter is dated



Peterhouse College arms



Peterhouse, Cambridge. Main entrance to the college, showing the chapel
Front

1284. The principal court assumed quadrangular form in the 15th century; the N. range was begun in 1424, and in 1431 a library was planned, of which three windows and the newel-stair survive.

The existing chapel, consecrated in 1632 and designed by Matthew Wren, master, 1625-34, and uncle of the architect, contains specimens of Munich glass. Cardinal Beaufort, Andrew Perne, Fynes Morison, John Cosin, Richard Crashaw, Isaac Barrow, Thomas Gray, Baron Kelvin, James Dewar, and A. W. Ward are famous names in the records of the college, which is under a master.

Peterloo Massacre. Name given to an encounter between soldiery and people at St. Peter's Field, Manchester, England, Aug. 16, 1819. It was applied in derision, the battle of Waterloo being still fresh in the public mind. Some 60,000 people had assembled for a demonstration in favour of parliamentary reform, and the police, by order of the magistrates, attempted to arrest their leader, a man named Hunt. This proving impossible, yeomanry appeared, and finally the magistrate ordered hussars to charge the crowd, with the result that eleven were killed and about 500 injured. The Free Trade Hall stands on the site. See Industrial Revolution; consult also *The Story of Peterloo*, F. A. Bruton, 1919.

Peter Martyr (1205-52). Dominican monk and saint. He was born at Verona, educated at the university there, and at the age of 15, admitted, by S. Dominic, to his order. He conducted missions with great success in the Romagna, Tuscany, Bologna, and Milan, and, appointed in 1232 head of the Inquisition, is said to have acted with greater zeal than mercy. He was murdered while returning from Como to Milan in 1252, and canonised in 1253.

Peter Martyr (1500-62). Italian Protestant reformer, whose surname was Vermigli. Born at Florence, May 8, 1500, he became abbot of an Augustinian monastery at Spoleto and principal of a college at Naples. Turning Protestant, he had to flee to Zürich in 1542, and became professor of theology at Strasbourg. Visiting England in 1547, he was appointed professor of theology at Oxford. On the accession of Mary he returned to Strasbourg, and later became a teacher of Hebrew at Zürich, where he died Nov. 12, 1562.

Peter Pan. Children's play, by Sir J. M. Barrie, produced, Dec. 27, 1904, at the Duke of York's Theatre, London. Based on

Barrie's tale, *The Little White Bird*, 1902, the play, retold as *Peter and Wendy*, 1911, deals with the adventures among fairies, pirates, and Indians of some children, who follow the guidance of Peter, the boy who never grew up. Revived frequently in London, at Christmas, it was played for the 1,000th time on Jan. 11, 1917. In the original production Nina Boucicault played Peter, a part taken by Cissie Loftus in 1905, by Pauline Chase from 1906 to 1913 inclusive, by Madge Titheradge in 1914, and by Unity More in 1915 and 1916. Barrie's *Peter Pan* in Kensington Gardens appeared in 1906, and a statue of the hero, by Sir George Frampton, was erected near to the Long Water in the gardens in 1912.

Peter Plymley's Letters. A series of ten letters by Sydney Smith (q.v.). It was published in 1807 and 1808 with the full title of *Letters on the Subject of the Catholics to my Brother Abraham who lives in the Country*, by Peter Plymley. The letters, full of scathing wit and searching irony, were appeals for the removal of the civil disabilities of the Roman Catholics.

Peters, HUGH (1598-1660). Independent divine. Educated at Trinity College, Cambridge, he began his career as a lay preacher, but was subsequently ordained and appointed to S. Sepulchre's, London. He settled in Holland about 1629, and became an Independent. In 1635 he went to New England, where he was one of the leading ministers at Salem. Sent to England in 1641 on colonial business, he joined in the attack on Laud, and served as an army chaplain during the Civil War. At the Restoration

he was tried for complicity in the death of Charles I, and executed, Oct. 16, 1660.

Peters, KARL (1856-1918). German administrator. Born at Neuhaus, he was educated at Göttingen, Tübingen, and Berlin, and in 1884 went to Zanzibar to organize a German colonial scheme. He secured treaties with native chiefs, and in 1885 returned to Berlin to get them approved, and founded a German East African Company. In 1891 he was administrator for Germany in E. Africa. From 1893-95 he was attached to the foreign office, Berlin. He was deprived in 1897 of his rank of imperial commissioner, to which he was appointed in 1891, for cruelty to the natives, and died at Woltorf, Brunswick, Sept. 12, 1918.

Peters, MATTHEW WILLIAM (1742-1814). English painter. Born in the Isle of Wight, he studied at the Dublin school of design. He began to exhibit at the Academy in 1769, became A.R.A. in 1771, and R.A. in 1777. His paintings were chiefly portraits, several of which were engraved by Bartolozzi and J. R. Smith. In 1783 he took holy orders, ultimately becoming a prebendary of Lincoln Cathedral, but continued his work as an artist. Peters died at Brasted, Kent, March 20, 1814.

Petersburg. City of Virginia, U.S.A. It stands on the Appomattox river, at the head of navigation, 24 m. S. of Richmond, and is served by the Norfolk and Western and other rlys., and by the Appomattox canal. Manufactures include tobacco, cotton, machinery, and silk goods, and there is a trade in timber. Petersburg was laid out in 1733, incorporated in 1748, and chartered as a city in 1850. It figured conspicuously in the Civil War, being besieged by the Federals under Grant, 1864-65. Pop. 31,000.

Petersburg, SIEGE OF. Concluding phase of the American Civil War, 1864-65. In June, 1864, the town of Petersburg was held by a Confederate force of 2,500 men. Recognizing that its possession would place Richmond in his hands, Grant assaulted the place, June 16-18, but was repulsed on each occasion with heavy losses. The siege which followed was signalled by great valour on the Confederate side, but Lee was eventually reduced to evacuate Petersburg and Richmond, April 2, 1865. Seven days later he surrendered to Grant at Appomattox Court House.

Petersfield. Urban dist. and market town of Hampshire, England. It is 55 m. from London and 19 m. from Portsmouth, with a station on the L. & S.W. Rly., on



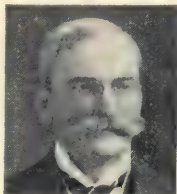
Peter Pan. Bronze statue by Sir George Frampton, R.A., erected in Kensington Gardens in 1912

which line it is a junction. The chief building is the church of S. Peter, partly Norman, and there is a town hall. In the market place is an equestrian statue of William III. Near is Bedale's school, conducted on co-educational lines. Petersfield was a borough with a merchant guild in the 12th century, and later a centre of the cloth industry. From 1553 to 1885 it was separately represented in Parliament, first by two and then by one member. Annual fairs are still held. Market day, Wednesday (alternate). Pop. 3,900.

Petersham. Par. and village of Surrey, England. Part of the bor. of Richmond, and called in Domesday Patricesham, Peter's Dwelling, Petersham once belonged to the abbey of S. Peter, Chertsey, and had a fishery of eels and lampreys. Passing to the crown in 1415, the manor was granted, with Ham (q.v.), in 1672, to John, earl of Lauderdale, and later to the earl of Dysart. The church of S. Peter, founded 1505, but mainly dating from 1790, has some interesting monuments. In the churchyard is the grave of Mary and Agnes Berry, Horace Walpole's "Elder-Berries." The adjoining hamlet of Sudbrook, which gives its name to Sudbrook Park, is mentioned in 1266. The grounds are occupied by the Richmond Golf Club. See Richmond.

Peter Simple. Novel by Frederick Marryat, first published in 1834. The hero, the fool of the family, is sent to sea, and has many adventures before he unexpectedly succeeds his grandfather as Viscount Privilege, and marries. Its sea yarns and humour give the book a perennial interest for boys.

Peterson, Sir William (1856-1921). British educationist. Born in Edinburgh, he was educated there, at Göttingen, and Oxford. He was first principal of University College, Dundee, 1882-95, and from 1895-1919 was principal of McGill University, Montreal. He was made K.C.M.G. in 1915, and died at Hampstead, Jan. 4, 1921. His works include editions of the Cluni MS. of Cicero, 1901, and Cicero's Verrine Orations. 1907.



Sir W. Peterson,
British educationist
Elliott & Fry



Petersfield, Hampshire. Market place and parish church of S. Peter, showing equestrian statue of William III
Frith

Peter's Pence. Tax levied in England by the pope from the 8th or 9th century, and subsequently extended to other countries. It was originally called Róm-feoh or Rome scot, and amounted to a silver penny per hearth. It was withheld by England in 1366 in order to bring pressure to bear on the pope to agree to the statute of praemunire, and was abolished by Henry VIII, 1534, though it has been since revived as a voluntary contribution by Roman Catholics.

Peter the Great Bay (Victoria Bay). Inlet of the Sea of Japan, on the S. side of the Russian Maritime Province in Eastern Siberia. It is 90 m. wide, extends 50 m. inland, and contains six bays and several small islands. The chief port is Vladivostok, which is situated on the Muraviev peninsula.

Petervarad, PETERVARADIN OR PETROVARADIN. Town of Yugoslavia, in the Syrmia dist. of Croatia-Slavonia. It stands on the right bank of the Danube opposite Novisad (Neusatz), with which it is connected by two bridges, and is 49 m. by rly. from Belgrade and 174 m. from Budapest. Pop. 5,000.

Petiole (Lat. *petiolus*, stalk or little foot). Stalk of a leaf, continued through the blade as the midrib. A strand of vascular tissue runs through it, by which water from the roots is conducted to the leaf-blade. The upper surface is frequently grooved, and the lower surface may be ridged. In leaves that possess the power of movement, independently of wind, the petiole is swollen at its base into a pulvinus or motile organ. This may be seen in the scarlet runner, which lowers its leaves and leaflets at night. The constant wind movement of aspen and other poplar leaves is due to the lateral flattening of the petiole. In clematis and tropeolum the petiole twists round any available support, thus enabling the plant to climb. See Leaf.

Pétion de Villeneuve, JÉRÔME (1756-94). French revolutionary. Born at Chartres, he practised law there and was elected to the states-general, 1789. He became president of the Assembly, 1790, and mayor of Paris in Nov., 1791. Relieved of the latter post after the Tuileries riot, June, 1792, he was reinstated by the Assembly.

He was named president of the national convention, but a quarrel with Robespierre led to his proscription. He joined the Girondists, and after an unsuccessful attempt at Caen to raise a Norman insurrection he fled into the Gironde, and in June, 1794, his body was found near St. Emilion.

Petit, Sir Dinshaw Manockjee (1823-1901). Parsee philanthropist. Born June 30, 1823, he entered business as a lad, and in his capacity of broker and agent acquired a large fortune. In 1887 he was appointed to the legislative council. He organized many charities in Bombay, and founded a hospital. Created a baronet in 1890, he died May 5, 1901.

Petit, GABRIELLE (d. 1915). Belgian heroine. She was arrested and tried by the Germans in the Great War for assisting Allied soldiers to escape. She was condemned to death on March 3, 1915, but was not executed until April 1. Regarded by the Belgians as their national heroine, a monument is to be erected to her in Brussels.

Petit Couronné. Hill of Macedonia, Greece. It rises S.W. of Lake Doiran, and was prominent in the Great War during the Allied campaign against the Bulgarians in Macedonia. It was finally stormed by Greek troops, Sept. 18, 1918. See Doiran-Struma Front.



J. Pétion de Villeneuve,
French revolutionary
After J. Guérin



Sir Dinshaw Petit,
Parsee philanthropist

Petition (Lat. *petere*, to seek). Term used for a request, generally one from an inferior to a superior. The word appears much in English history. The right of petitioning the king was claimed at an early date and was established in the time of Henry IV, the reason for this insistence being the fact that many evils could only be redressed by the personal action of the sovereign. In 1689 the right of subjects to petition the king was laid down in the Bill of Rights. Until the time of Henry VII, legislation was usually based on petition, the laws being drafted by the judges from the petitions received. In certain cases the crown still receives petitions.

The modern petition is usually to one of the Houses of Parliament, generally the Commons. This became a frequent practice in the time of Charles I, and petitions are still presented, urging members to act in a certain way. To protect itself from violence, Parliament enacted, in 1662, that not more than ten persons shall present a petition. See Commons, House of; Parliament.

Petition of Right. In English law, the method of proceeding to obtain redress against the crown, e.g. compensation for a wrong, damages for breach of contract, possession of property and the like. The king cannot, technically, be sued in his own courts. Therefore the aggrieved subject presents a petition, setting out briefly his claim. This is sent to the attorney-general, who writes on it "Let right be done"; and thereafter, under Bovill's Act, 1860, the proceedings are carried on almost exactly as in an ordinary action between ordinary litigants.

Petition of Right. Statement of constitutional claims presented to King Charles I. Having during the first three years of his reign raised money without consent of parliament, and done other arbitrary acts, Charles I encountered a stiff resistance when, in 1628, he called his third parliament. Wentworth, Pym, and others drew up the Petition of Right, which passed through both Houses, and was signed by the king on June 7. By signing it Charles promised never again to raise money without consent of parliament or to imprison anyone for refusing to pay an illegal tax; not to billet soldiers in private houses, or put martial law into operation. The Petition of Right is frequently confused with the Bill of Rights of 1689.

The Humble Petition and Advice was the name given to an address presented to Cromwell in

1657, urging him to accept the crown and suggesting certain changes in the constitution. See Forced Loan.

Petitio principii (Lat., begging the question). In logic, the fallacy of assuming what is to be proved as the premise of a syllogism, or making use of a premise, the truth of which is not admitted. An instance of this is Aristotle's argument: All bodies tend towards the centre of the world; all bodies tend towards the earth; therefore the earth is the centre of the world. How can it be affirmed that all bodies tend towards the centre of the world, without assuming what it is desired to prove, viz. that the earth is that centre? It is akin to arguing in a circle, or using a premise to establish a conclusion and then proving the premise by the same conclusion. See Logic.

Petit Journal, LE. Paris morning newspaper, established Feb. 2, 1863, and the pioneer of the popular press in France. It is rivalled in circulation by Le Petit Parisien, founded in 1876. By 1917 the circulation of each of these journals exceeded 1,250,000. In 1889 Le Petit Journal started a weekly illustrated supplement in colours, and in 1896 the weekly Petit Journal agricole and Le Petit Journal illustré de la Jeunesse. Le Petit Parisien began a weekly illustrated supplement, Le Miroir, in 1912.

Petit Mal. Mild form of epilepsy, not associated with convulsions. The condition is characterised by sudden short attacks of unconsciousness, or complete oblivion to the surroundings. Sometimes during an attack unusual acts are performed. In some cases the attacks are accompanied by sensations of faintness and giddiness. The condition may last for many years, or may pass into ordinary epilepsy with convulsions. The patient should live a careful life, avoiding excess, and should not follow any occupation which would be dangerous in the event of an attack coming on.

Petits Chevaux (Fr., little horses). Gambling machine. It is a miniature representation of horses with their jockeys, which revolve round a circular space in the centre of a long table. The mechanism is so contrived that each horse revolves independently, and the momentum is applied in such a manner as to leave the result of each spin a matter of pure chance. There are nine horses, No. 1 being on the outermost and No. 9 on the innermost circuit. The middle horse, No. 5, resembles

somewhat the zero in roulette (q.v.); it can only be backed to win outright, cannot be coupled with any other "runner," and when it wins, all stakes on the even-money chances are lost and go to the bank. See Petits Chevaux and how to play it, Aitch, 1904.

Peto, SIR SAMUEL MORTON (1809-89). British contractor and politician. Born at Woking, Aug.



Sir Samuel Peto, British contractor

4, 1809, he inherited in 1830 a share in his uncle's business, built the Reform and several other London clubs, and the Nelson Column. In 1846 he founded the firm of

Peto and Betts, which constructed railways in many countries. He was made a baronet in 1855. In 1866 financial disaster overtook his firm, which was obliged to suspend payment. Peto gave up his seat in parliament, and passed the rest of his life in retirement, dying Nov. 13, 1889. Peto was a leader among the Baptists, and M.P. for Norwich, 1847-54, for Finsbury, 1859-65, and for Bristol, 1865-68. He was responsible for Peto's Act, 1850, by which religious bodies can hold property by a simpler title than heretofore.

Petőfi, SANDOR (1823-49). Hungarian poet. He was born at Kis Kőrös in the province of Pest, Jan. 1, 1823.

He lived for a time by acting and by translating French and English novels, and in 1844 he brought out a volume of poems which procured him fame.



Sandor Petőfi, Hungarian poet

In 1848, having served the revolutionary cause as poet, orator, and journalist, he joined the Hungarian army, becoming captain and aide-de-camp to General Bem. He fell at the battle of Segesvár, July 31, 1849. A leader of the Romantics, he wrote fine epics like János Vitéz and The Apostle: but his fame rests on his shorter poems of love and war, and he is generally regarded as the greatest Hungarian lyrical poet. Sir John Bowring translated his best poems, 1866.

Petone. Suburb of Wellington, New Zealand. Standing on Port Nicholson, it has government rly. works, large refrigerating works, and woollen mills. The first settlement was made in 1840. Pop. 7,000.



Petra (Gr., rock). Ruined capital of the Nabataeans. Known also as Sela, Joktheel, or Reqem, it lies under Mount Hor, between the Dead Sea and the Akaba Gulf. An extraordinary gorge leads to a masterpiece of Greek art, the Khazne Fir'aoun, a rose-red temple with graceful columns, and sculptures of winged war-maidens, Arab warhorses, and war dances. Beyond is a mountain-ringed oval space, about one mile long and $\frac{3}{4}$ m. broad.

Here stood the vanished city of Petra, which is represented by thousands of rock tombs, ranged in tiers on the iridescent sandstone flanks of encircling mountains. Royal tomb fronts, rising to 65 ft., with decorated windows, large sculptured porches, and two or three storeys of pillars, copy the lost palaces. In noble mansions of death survive the dwelling-places of merchant princes, and square cottages of commoners are represented by small, plain-fronted tombs. In the oldest work, pylons indicate Egyptian influence; later carving shows connexion with Persian art. The Syrian arch is used, and the finest works are in Greco-Roman style, dating from the Augustan age.

As an Edom stronghold, Petra was carried with immense slaughter by the Judeans, under Amaziah, in the 9th century B.C. In Assyrian and Babylonian invasions it became the refuge of the Nabataeans. They used the valley as a burial place and treasure store, and it was raided in 312 B.C. by Macedonians, and later by Pompey's Romans. But the nomads held the desert line from Damascus to the Red Sea, controlling most of the commerce between the Indian Ocean and the Mediterranean. Winning the favour of Augustus by a victory over Cleopatra's Red Sea fleet, they completed their practical monopoly of the trade of the Orient.



Petra, the rock city of Edom. 1. Temple of El-Deir, hewn from the living rock. 2. Tomb of the Three Storeys, the largest sepulchral monument. 3. Rock-hewn building called the Treasury. 4. Theatre, cut out of the cliff, with 33 tiers of seats, accommodating 3,000 spectators

In A.D. 105 Trajan captured the city. What he wanted was its wealth and trade. All he obtained was the shell of it, for the Nabataeans shifted their commerce to Palmyra (*q.v.*). Treasure hunters began to break into tombs, and Saracens of the 7th century A.D. wrecked the town in search of buried spoil. In addition to the empty funeral caves, little remains, even in ruin, except the temple in the gorge, a great amphitheatre, and the wreck of a colossal classic temple on the mountain top of El-Deir. In the Great War Petra was used as a base by Col. T. E. Lawrence (*q.v.*), in his attack on the rly. and the 4th Turkish army. **Edward Wright**

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Petrarch (Ital. *Petrarca*) (1304-43). Italian poet and humanist. Son of a notary, who was exiled with Dante from Florence, he was born at Arezzo, Tuscany, July 20, 1304. Christened Francesco, he

changed his family name of Petrarco to Petrarca. Taken to Avignon at the age of nine, he was educated there, at Montpellier, and at Bologna. He early displayed a love for the classics, but studied for the law, which, after his father's death in 1326, he abandoned for letters.

He took minor orders, found generous patrons, particularly in the Roman house of Colonna, and won the friendship of Azzo di Correggio. In 1327, in the church of S. Clara, Avignon, he first saw the Laura who inspired his muse, and "made to bud forth with the noblest sentiments all the seeds of virtue which nature had sowed in his heart." This lady, to whom he addressed some 300 sonnets, has been doubtfully identified with Laura di Noves, the wife of Hugo de Sade. She was the mother of eleven children when she died of the plague in 1348.

While pursuing ardently his Latin studies, the writings of Cicero, Virgil, Livy, and Seneca, and regarded by his younger

literary contemporaries as their leader, he took a deep and constant interest in public affairs. He travelled in France, Germany, and the Netherlands. Kings and popes competed for his society, he was induced to undertake important public missions, and in letters to rulers and public men he endeavoured to influence their policy to the advantage of his native country. He wrote a treatise on government, and in 1351 his advice was sought in the drafting of a constitution for Rome, in which city, on Easter Sunday, 1341, he had been crowned poet-laureate. He disliked Avignon, then the seat of the papal court, and found a congenial retreat at Vacluse, which he left finally in 1353 for Milan, Venice, and Arquà, since called Arquà Petrarca, a village on the S.E. of the Euganean Hills, near Padua, where he died July 18, 1374.

Petrarch has been called the first of the moderns. A scholar at a time when all books were in MS., and texts were at the mercy of the copyists against whom he decried, his fame soon became universal in Europe, largely through his sonnets and other poems, which were written in Italian, and exerted a lasting influence on the love poetry of France and England.

The spiritual and mystical side of his character was in curious contrast to his literary paganism. As a poet he possessed an acute sense of melody, of the beautiful in expression. The first to popularise the sonnet, he set chief store by his Latin works, especially his unfinished epic, *Africa*, which has Scipio Africanus as hero, and his *De Viris Illustribus*, or *Lives of Famous Men*. His letters, of which he kept copies, throw light on the intellectual life of his time; his dialogues are remarkable for their self-revelation. His friends included Boccaccio, with whom he kept up a regular correspondence and whose story of *Griselda* he translated into Latin. Petrarch, to quote Villari, was the first to write freely of all things in the same way that a man speaks.

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Petrarch. Italian poet, and first of the humanists

Petre. Name of an English family now represented by Baron Petre. Sir William Petre (d. 1572), a native of Devon, was a public servant under Henry VIII. He rose to be a secretary of state, and was sent on missions abroad. His son John was made Baron Petre of Writtle in Essex in 1603, and the title has since been held by his descendants, all adherents of the R.C. faith. William, the 4th baron, was a victim of Titus Oates, and William Joseph (1847-93), the 13th, a priest. The family seats are Writtle Hall and Ingatstone Hall, both in Essex. Another Petre of note was Sir Edward (d. 1699). Known as Father Petre, he was confessor to James II, and became, in 1693, head of the Jesuit college at St. Omer. The 16th baron (1890-1915), a captain in the Coldstream Guards, died of wounds received in action, 1915. *Pron.* Peter.

Petrel (Dim. of Peter, from some species appearing to walk on the water). General name for about 100 species of oceanic birds, constituting the order Tubinares. It includes the albatross, diving petrels (*Pelecanoides*), storm petrels (*Procellaria*), flat-billed P. (*Prion*), fulmar P. (*Fulmarus*), and the shearwater P. (*Puffinus*). They have a rudimentary hinder toe,

hooked bill, and tubular nostrils. They nest in burrows or rock-clefts, and lay a single egg. The name indicates more particularly the storm petrel, or Mother Carey's chicken (*Procellaria pelagica*), which breeds in Britain, chiefly in Scotland and Ireland, and is found in the N. Atlantic, though it does not nest on the American side. It is a swallow-like black bird, with a patch of white in front of the tail. Normally subsisting upon small surface animals, it often follows, and alights upon, ships to pick up scraps.

Petrie, GEORGE (1790-1866). Irish antiquary. Born in Dublin, Jan., 1790, he became a Royal Hibernian Academician, and painter of Irish scenery and remains. His *Essay on Round Towers* (q.v.) received the Irish Academy prize, 1830. His *Antiquities of Tara Hill*, 1839; *Ecclesiastical Architecture of Ireland*, 1845; and *Ancient Music of Ireland*, 1855, represent researches facilitated by his superintendence of the antiquarian section of the Ordnance Survey of Ireland, 1833-46. After his death, Jan. 17, 1866, his collections were acquired for the Dublin museum. *Pron.* Peatry.

Petrie, SIR WILLIAM MATTHEW FLINDERS (b. 1853). British Egyptologist. Born at Charlton. June 3, 1853, he surveyed Stonehenge and ancient British earthworks, 1875-80. Applying similar methods to the pyramids of Gizeh, 1880, he undertook thereafter, down to 1914, systematic excavations in Egypt, especially at Naucratis, Daphnae, Coptos, Nagada, Abydos, Amarna, Memphis, and Tarkhan. His finds include Roman portraits at Hawara, and jewelry and papyrus hoards. He excavated Lachish, 1890, for the Palestine Exploration Fund. Edwards professor of Egyptology at University College, London, since 1892, he founded the Egyptian Research Account, 1894, enlarged as the British School of Archaeology in Egypt, 1905. Besides numerous works covering the whole field of Egyptian history, he wrote *Revolutions of Civilization*, 1911; *Eastern Exploration*, 1918; *Some Sources of Human History*, 1919. He was knighted, 1923. *See* Egypt; Port. Gallery of Contrib.

Petrograd. Government of N.W. Russia. It is bounded N. by Finland, E. by Olonets and Novgorod, S. by Pskov, and W. by Esthonia. The soil is marshy, and climate damp. There is little mineral wealth, and agriculture is backward. The chief industries are forestry, and shipbuilding, and the manufacture of glassware, boots and shoes, and textile fabrics. Area, 17,226 sq. m. Pop. 3,200,000.



Petrel. Storm petrel, *Procellaria pelagica* or Mother Carey's Chicken, of the North Atlantic Ocean



Petrograd (Leningrad). Plan of the capital of the former Russian empire

Petrograd. Former capital of the Russian empire, known until 1915 as St. Petersburg, and since 1924 as Leningrad. Situated on a swamp of the River Neva and the Gulf of Finland, its main

part lies on the left side of the river, S. of the fortress of Peter and Paul, on an islet, which was the original site of the city. It covers an area of 35 sq. m., and is divided into 13 districts.

The Neva, 40 m. long, flows from Lake Ladoga past the city. Beyond the Alexander Bridge it divides into three distributaries, and falls into the Gulf of Finland at the Islands. The channels are spanned by numerous bridges, the most important of which are the Troitsky, Alexander, and Nicholas. The city is drained by four canals, Moika, Catherine, Fontanka, and Obvodni. During the rainy season floods are frequent. From Nov. to April the river is ice-bound.

Petrograd has more claim to be a European city than any other city in Russia. The Nevski Prospekt, which intersects the city practically in a straight line from the Admiralty to the Alexander Nevski monastery, turning abruptly at the Nicholas rly. station, contains the Kazan Cathedral, modelled on S. Peter's at

Rome, Anichkov palace, the City Hall or Duma, and the Gostini Dvor, a once-noted shopping centre. Other notable buildings are the winter palace, a residence of the tsars, the Taurida palace, S. Isaac's Cathedral, and the Hermitage, once one of the finest picture galleries in Europe. The Lyëtniyi Sad or Summer Garden, on the left bank of the Neva, may be called the Hyde Park of Petrograd. Adjacent is the Field of Mars, where the victims of the Revolution of 1917 were buried. Across the river is the fortress of Peter and Paul, containing the state prison, the mint, and the arsenal. In the vaults of the cathedral of SS. Peter and Paul are buried the emperors of the house of Romanov with the exception of Peter II and Nicholas II.

The islands which form the delta of the Neva number about 100. The most important is Aptekarski or Apothecary Island. It contains the Imperial Botanical Gardens laid out by Peter the Great in 1713.

Petrograd possesses many schools and learned institutes. The most noted of these are the university, founded by Alexander I in 1819, technological institute, the naval and military academies of law and medicine, besides schools of forestry, mining and engineering, and the conservatory of music where Rubinstein taught. There were also progressive schools for

the higher education of women. Many of these buildings were used by the Soviet government for administrative purposes. Before the establishment of the Soviet government there was a large trade in textiles, metals, rubber, tobacco, and chemicals.

Petrograd formed part of the ancient territory known as Ingermanland or Ingria. It belonged to Novgorod and Moscow; then to Sweden; and was reconquered by Peter the Great in 1702. With the object of bringing Russia closer to W. Europe, he determined to build a new capital at the mouth of the Neva which was to be a "window to look out into Europe." The first stone was laid in 1703, on the site of what is now the fortress. Fifty years later the city numbered 80,000 inhabitants. After the defeat of the Swedes at Poltava, 1709, Petrograd became the capital. The first rly. line to Moscow was laid by Nicholas I, who thus brought Petrograd closer to the heart of the empire.

Rlys. run direct to the Murman coast, to Perm, with a branch to Archangel; direct communication with Germany has been broken by the new Baltic States. The harbour is connected with the outpost, Kronstadt, by a ship canal 18 m. long and 22 ft. deep; ice breakers keep the waters open except in the severest winters.

Petrograd was the scene of the revolution, March 12, 1917, and here in Sept., 1917, a republic was proclaimed. After the Bolshevik *coup d'état* in Nov., 1917, the Soviets took over the administration, making the Smolni Institute their headquarters. The capital was transferred to Moscow on March 14, 1918, and Petrograd proclaimed a free port. Several attempts were made to overthrow the Soviet government and restore the old régime, Yudenitch's troops reaching the suburbs in 1919. After the death of Lenin (*q.v.*) in Jan., 1924, the city's name was changed to Leningrad. Pop. (1915) 2,300,000. See St. Petersburg, G. Dobson, 1910; Petrograd, Past and Present, W. B. Stevens, 1915; Petrograd, the City of Trouble, Meriel Buchanan, 1918.

R. M. Birkmyre

Petroleum. Term meaning literally rock oil. Technically it is applied to a number of fluid substances, minerals, obtained from the crust of the earth, varying in character from natural gas and the clear and limpid naphthas of Georgia on the Caspian to the heavy bitumen of the great Trinidad lake. Commonly it is used for crude mineral oil. See Oil.



Petrograd arms under the Empire



1. Cathedral of S. Isaac, built 1819-58, and statue of Nicholas I. 2. Fortress of S. Peter and S. Paul, with its church and spire, 394 ft. high. 3. Office of the General Staff, built 1819-47. 4. Narva triumphal arch, commemorating the deeds of the Russian Guard,

1812-14. 5. Nevski Prospekt, the longest and finest street in the city. 6. The Winter Palace, from the Neva. 7. Church of Our Saviour, built in 1910. 8. View from the right bank of the Neva, showing Nicholas Bridge and the dome of S. Isaac's

PETROGRAD (LENINGRAD): VIEWS IN THE RUSSIAN CITY FOUNDED BY PETER THE GREAT

Petrolia. Town of Ontario, Canada. It is 50 m. from London, being a station on the G.T.R. and Michigan Central Rly., and obtained its name from the oilfields in the vicinity. Industries include the making of butter, bricks, etc., and those connected with obtaining and refining the oil. Pop. 3,500.

Petrology (Gr. *petra*, rock; *logos*, science) Science of rocks. Also called petrography or lithology, petrology is one of the divisions of geology, overlaps the kindred science of mineralogy, and is concerned with the composition, chemical and mineralogical, the structure, and the classification of rocks. The full study of rocks involves the use of the petrographic microscope equipped for the study of the optical properties of the rocks; a knowledge of chemistry in all its branches; of many branches of physics, as crystallography, etc.

Rocks for examination under the microscope are usually cut into thin sections, and for chemical analysis or for separation purposes crushed into small grains. In putting a rock into its proper category some characteristics which have

versal sanction. In this work every well-known rock is separately described. See *Geology; Rocks*; consult also *Petrology for Students*, A. Harker, 4th ed. 1908; *Text Book of Petrology*, F. H. Hatch, 6th ed. 1910; *Manual of Petrology*, F. P. Mennell, 1913.

Petronius (d. A.D. 65). Roman writer, whose full name was Gaius Petronius Arbitr. According to Tacitus he received his last name through being regarded as the supreme judge or arbiter of elegance in the vicious society in which he lived. Although he passed his days in sleep and his

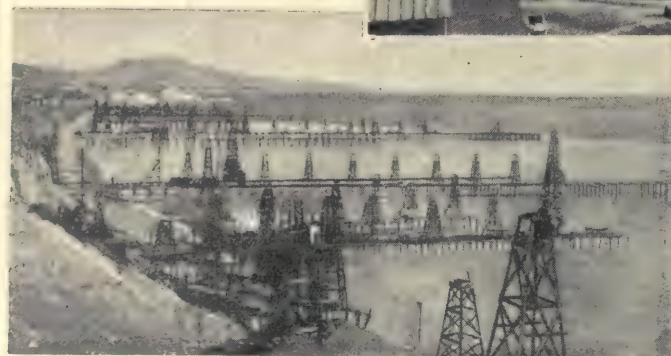
nights in business or pleasure, as governor of Bithynia he was a capable administrator. Apparently Petronius aroused the jealousy of Tigellinus, and anticipated his fate by opening his veins in a warm bath.

Petronius was the author of a remarkable work of fiction, called *Satyricon*, of which considerable fragments have been preserved. It describes the adventures of a Greek freedman in various parts of Italy, and shows a keen sense of humour and an exceedingly shrewd knowledge of human nature; it is valuable, moreover,

as throwing an interesting light on the social life of the period. Many of the characters are made to talk in the *plebeius sermo*, or language of the common people, and the difference between this and literary Latin affords important material for the philologist. The best known section of the book

is the *Cena Trimalchionis* (Supper of Trimalchio), which describes an entertainment at the house of a vulgar parvenu. See *Petronius Text and Trans.*, M. Heseltine, 1913.

Petropavlovsk. Name of two towns in Asiatic Russia. (1) In the govt. of Akmolinsk, on the Ishim and the Siberian Rly. It has soap works and tanneries, and a trade in cattle, grain, wool, and cloth. Pop. 20,000. (2) In Siberia, on the peninsula of Kamchatka. Pop. 400.



to be considered by the petrologist are its composition, hardness, colour, crystalline or non-crystalline character, specific gravity, etc.

Rocks are divided into three main classes, each in turn subdivided into many groups. These classes are sedimentary rocks, igneous rocks, and metamorphic rocks. Examples of the first class are sandstones, grits, clay, slate, and marls; of the second, granite, olivine, and feldspars; and of the third, schists and gneisses. Because the igneous rocks lack fossils, their classification must ultimately depend upon petrological investigations. Such rocks comprise a very large fraction of the earth's crust, yet their origin is so obscure and their characteristics are so diverse that none of the suggested classifications has received uni-



Petroleum. 1. The petroleum bores at Campina, in the Rumanian oilfields. 2. Summerland oilfield in California, where the wells are drilled 300 ft. below sea level and beyond the shore line. 3. Overflow of oil running into a natural reservoir, Rumania

Petropolis. Town and summer resort of Brazil, in the state of Rio de Janeiro. Finely placed on the Serra da Estrella, 34 m. by rly. N. of Rio de Janeiro, in a healthy climate, it manufactures cotton and silken goods, cigars, cheese, and beer. It was colonised by Germans in 1845, and was capital of the state, 1893-1903. Pop. 30,000.

Petrovsk. Town of S.E. Russia. It is in the govt., and 70 m. N.W. of Saratov, on the river Medvieditsa, and the Atkarsk-Volsk railway. It has tanneries, tallow-boileries, and oil-mills, and was founded by Peter the Great in 1698. Pop. 19,000.

Petrozavodsk. Town of N.W. Russia. It is in the govt. of Olonets, 190 m. N.E. of Petrograd, and on the W. shore of Lake Onega. There is trade in grain and timber. In 1703 an iron-foundry was established here by Peter the Great, and in 1774 an imperial cannon foundry. Pop. 15,000.

Petruchio. Character in Shakespeare's comedy *The Taming of the Shrew*. A gentleman of Verona who wished to marry a wealthy wife, he is introduced to the notorious scold, Katharina, the elder daughter of Baptista, a rich gentleman of Padua, whom, having married against her will, he succeeds in reducing to docility.

Pett, PHINEAS (1570-1647). English shipbuilder. Son of Peter Pett, a skilful shipwright, he was born at Deptford, Nov. 1, 1570. He held various posts under Lord Admiral Howard, and in 1601 became assistant shipwright at Chatham. His skill in designing vessels attracted the royal attention, and in 1605 he was appointed master shipwright at Deptford, and in 1607 at Woolwich. In 1630 he became a commissioner of the navy. The *Prince Royal*, 1610, and the *Soverayne of the Seas*, 1637, were his masterpieces. See *Autobiography*, ed. W. G. Perrin, 1918.

Petticoat (Eng. *petty*, short, and coat). Comprehensive term for underskirts worn by women. Al-

though now an article of female attire, petticoats of mail were worn by soldiers in the Middle Ages, and towards the end of the 15th century men wore them of material beneath a coat which was longer in the skirt. Thus the garment was termed the petticoat. See *Costume*.

Petticoat Lane. Name, until about 1830, of Middlesex Street, London, E. Running N. from High Street, Whitechapel, to Widegate Street, Bishopsgate, and extended and partly rebuilt since the latter part of the 19th century, it was known in Stow's time as Hog Lane, being then lined with elms, and famous for its air. The French ambassador, Gondomar, is said to have lived in the adjacent Gravel Lane, in which the antiquary Strype was born. In the 17th century Petticoat Lane was the centre of a colony of French refugee weavers, but it has for many years been a Jewish quarter, notable for its Sunday morning



Petticoat Lane, London, during the Sunday morning market

Oxford, becoming professor of anatomy there, 1651, and also professor of music at Gresham College, London. Employed in distributing forfeited lands in Ireland, he was made surveyor-general there after the Restoration, and promoted Irish industries. An M.P., an original F.R.S., and an inventor, he was a pioneer in economics, as shown by A *Treatise of Taxes and Contributions*, 1662, and many other works. He was knighted 1662, and died Dec. 16, 1687. His two sons were



Sir William Petty, English economist

earls of Shelburne, and through his daughter, who married the earl of Kerry, his Irish estates descended to the marquess of Lansdowne. See *Economic Writings of Sir W. Petty*, ed. C. H. Hull, 1899.

Petty Bag Office. In England, the name of a branch of the court of chancery. Its work, which was in connexion with the common law jurisdiction of the court, was abolished in 1873. The name was due to the fact that the writs with which it was concerned were carried in the little bag of the office. See *Chancery*.

Petty Officer. In the British navy, rank below and next to warrant officer, corresponding to that of non-commissioned officers in the army. They are selected from leading seamen of very good character with at least one year's sea-going service. Candidates are examined in general education, seamanship, elementary signals, semaphore, the rule of the road at sea, management of boats under steam, use of compass and lead, anchor work, rigging sheers and derricks, the watertight fittings, pumps, and



Petruchio and the tailor. Scene from *The Taming of the Shrew*, act iv

From the painting by Charles E. Leslie, R.A.

open-air market, in which second-hand clothing forms a conspicuous feature. See *Houndsditch*.

Pettie, JOHN (1839-93). Scottish painter. Born at Edinburgh, March 17, 1839, he studied at the Trustees' Academy. He came to London in 1862; attracted attention with his *Drumhead Court Martial*, 1865; became A.R.A. in 1866, and R.A. in 1873. He died at Hastings, Feb. 21, 1893.



John Pettie, Scottish painter
Elliott & Fry

He was essentially an interpreter of chivalrous romance. See *Charles Edward*; *Duel*; *Knighthood*.

Petty, SIR WILLIAM (1623-87). English economist. Born at Romsey, Hampshire, May 26, 1623, he studied at Leiden and Paris, taught chemistry and anatomy at



Phineas Pett, English shipbuilder
After W. Dobson

constructive details of the ship in which they are serving, and writing up the log book. The candidate must also have a gunnery or torpedo qualification.

In the military branch the petty officers include yeomen of signals, P.O. telegraphists, and sailmakers; in the engineering branch, stoker petty officers, mechanics, and engine-room artificers, the two last being chief petty officers; in the artisan branch, joiners, shipwrights, blacksmiths, plumbers, painters, coopers, armourers, and electrical artificers (the last being chiefs); in the medical branch, sick berth stewards; in the accountant branch, writers, ship's stewards, and cooks; and also ship's corporals and masters-at-arms. See Navy, colour plate.

Petty Sessions. In English law, sittings of justices of the peace or of a stipendiary magistrate under certain statutes. The courts of petty session are those which try in a summary way, without a jury, certain minor offences, and the power of punishment which may be inflicted is strictly limited. See Magistrate; Metropolitan Police Court; Police Court.

Petunia. Perennial ornamental herb of the natural order Solanaceae. A native of S. America, it



Petunia. Leaves and flower of the perennial South American plant

was introduced into Britain early in the 19th century. The plants are from 6 ins. to 2 ft. high, and the funnel or salver shaped flowers are chiefly red, violet, blue, and white in various shades. They need ordinary greenhouse culture in spring, and may be planted out in the open garden in May or June. Propagation is by cuttings of old plants, or seeds sown in spring.

Petworth. Market town of Sussex, England. It is near the W. Rother river, 14 m. from Chichester and 55 m. from London, with a station on the L.B. & S.C. Rly. S. Mary's Church, an old building restored, has memorials of the Percy and Wyndham fami-



Petworth, Sussex. East Street and the parish church of S. Mary

lies. Stone quarries are in the neighbourhood, and cattle fairs are held in the town. Pop. 2,580.

Petworth House is the seat of Lord Leonfield. It occupies the site of a castle of the Percy family, around which the town grew. From the Percys it passed to the duke of Somerset, then to the earl of Egremont. The 3rd earl of Egremont built the present house, about 1800, and in his time it was famous for its hospitality. It contains some fine carvings by Grinling Gibbons, and stands in a park 12 m. in circumference.

Peutinger Table. Only extant pictorial itinerary of the ancient Roman empire. Conrad Celtes, who discovered it at Ratisbon, 1507, bequeathed it for publication to Conrad Peutinger of Augsburg. Now in Vienna, it is a 13th century copy from a somewhat earlier version of a lost original, compiled probably in the 3rd century from older materials collected by Agrippa (d. 12 B.C.). Upon a strip 24½ ft. by 13½ ins. are 12 panoramic segments depicting—with distances—the military roads and trade-routes from S.E. Britain to the Ganges mouth.

Pevensey. Village of Sussex, England. It stands on Pevensey Bay, 6 m. from Eastbourne, and 12 m. from Hastings, with a station on the L.B. & S.C. Rly. It occupies the site of the Roman station of Anderida, and was the landing place of William the

Conqueror. A castle, of which the picturesque ruins remain, was built here by the Normans, who erected it within the Roman walls, which still stand. There is an old church, S. Nicolas, and the Mint House is said to be 600 years old. Pevensey, one of the Cinque Ports, was a corporate town from about 1066 until 1883. As the sea receded, the harbour became filled with shingle, and the port decayed. Pop. 500. See Anderida.

Peveril of the Peak. Sixteenth of the Waverley novels, published Jan., 1823. Its period is 1658-78, and the scene shifts between Derbyshire, the Isle of Man, and London. It introduces the Popish Plot, and deals with the estrangement between the Cavalier Peverils and the Puritan Bridgenorths. The fanatic, Edward Christian, ready to sacrifice his niece Alice Bridgenorth to his revenge against the countess of Derby; Major Bridgenorth, whose enmity against the countess destroys his friendship with the Peverils; Buckingham, the king's favourite; the intriguer Chaffinch and his mistress; and the mercurial earl of Derby are the chief characters. The love interest centres on Julian Peveril and Alice Bridgenorth.

Pew (probably O. Fr. *puye*, a balcony). Name for an enclosed seat in a church; originally any enclosure fitted with writing desk, etc., where a public official could transact his business. Church pews, often elaborately carved, were used in the Middle Ages, but the large, plain, and high-backed box pew came in after the Reformation. The appropriated family pew disappeared shortly after the middle of the 19th century. The partitions between box pews were four or five ft. high; and access was through a small door. A few of these enclosures survive in English and Scottish churches, but the modern pew is merely a bench with a back. Parishioners have a right at common law to a seat in their parish church without payment, the seats being disposed by the churchwardens acting as officers of the ordinary.

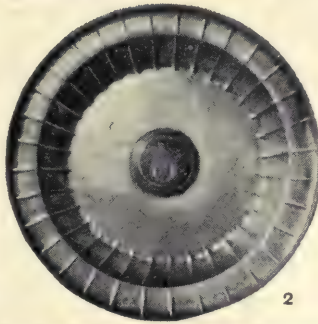


Pevensey, Sussex. Walls of the ruined Norman castle, from the north-west



Pewsey. Town of Wiltshire, England. On the Avon near the Kennet and Avon canal, 11 m. from Marlborough, it is served by the G.W. Rly. The old church of S. John the Baptist has been restored. It is an agricultural centre. The valley in which it lies is called the vale of Pewsey. Pop. 1,700.

Pewter. Alloy at one time very largely used for the manufacture of drinking vessels, salt cellars, trays and plates, inkpots, etc. Its preparation in Great Britain was more or less regulated for many generations by the Pewterers' Company of London.



Pewter. 1. Examples of church pewter: (A) Chalice, Edinburgh, 1794; (B) Flagon, Musselburgh; (C) and (D) Early chalices; (E) Scottish flagon. 2. Dish with gilded boss, temp. Charles I. 3. Pear-shaped pint measure, Glasgow. 4 and 6. Flagons. 5. Inkstand with two wells and water box. 7. German flagon

From *The Pewter Collector*, by courtesy of Herbert Jenkins

Company of London. While the composition of pewter has varied very much, the commonest variety consists of about 80 p.c. tin and 20 p.c. lead; a class known as "trifle" pewter has tin 79 parts, antimony 15, and lead 6; while a "plate" pewter is made without lead at all, and consists of tin 90 parts, antimony 7, bismuth 2, and copper 1 part. As a metal pewter is soft, somewhat resembling tin in colour, but duller and darker. Owing to the risk of poisoning by lead through the constant use of pewter its use has been restricted. Old pewter is a favourite subject of collectors of rare objects. See Alloy; Britannia Metal.

back to the middle of the 14th century, its first charter was granted in 1474, arms being allowed in 1479. It formerly had rights of search and assay. The first hall, in Lime Street, E.C., was built in 1497, and destroyed in the fire of 1666, was rebuilt 1678, again burnt in 1840, and then rebuilt a second time. Its corporate income is £5,250; trust income, £232. See History of the Pewterers' Company, C. Welch, 1902.



Pewterers' Company arms

Bibliography. Old Pewter, M. Bell, 1906; Pewter Marks and Old Pewter Ware, C. A. Markham, 1909; Pewter Plate, H. J. L. Masse, 2nd ed. 1910; Silver, Pewter, Sheffield Plate, F. W. Burgess, 1921; The Pewter Collector, H. Jenkins, 1921.

Pewterers' Company, THE, London city livery company. With a history going

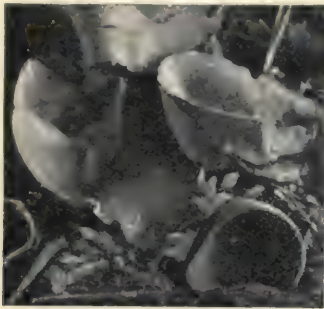
Peyotl. Species of spineless cactus (*Lophophora williamsii*), with a large, parsnip-like root. Aztecs cut this root into transverse slices, to be powdered, and ate it, or took it in drink, with religious ceremony, under the name of teonanacatl, or "flesh of God." Under its influence the consumer saw visions, and was said to have the power of prophecy. Similar ceremonial use of the plant is made in the present day by various Indian tribes in Oklahoma.

Peyton, SIR WILLIAM ELIOT (b. 1866). British soldier. Born May 22, 1866, he entered the 7th Dragoon Guards in 1885, first saw active service in 1896 in the Sudan; was in the Sudan campaign of 1897 and 1898, being there wounded and winning the D.S.O.; and served in the S. African War. From 1903-7 he commanded the 15th Hussars, and from 1908-12 a cavalry brigade in India. During the earlier stage of the Great War Peyton served in Gallipoli, and he was then transferred to Egypt. There he commanded the force that defeated the Senussi and reoccupied Sollum early in 1916. From Egypt he went to France, and was, May, 1916, to April, 1918, military secretary at general headquarters, and in 1922 military secretary to the secretary for war.

Pézenas. Town of France. In the dept. of Hérault, it stands on the Peyne, near the mouth of the Hérault, about 25 m. S.W. of Montpellier. There is a trade in wines and spirits, and there are iron-foundries, oil and brandy refineries, and tanneries. Molière wrote his *Précieuses Ridicules* here. Pézenas is the Gallic Piscennae. Pop. 7,000. Pron. Paiznah.

Pezinec. Town in the Slovakia division of the Czecho-Slovak republic, formerly called Bazin (*q.v.*).

Peziza. Genus of fungi of the natural order Discomycetes. They are fleshy, brittle, cup-shaped, or saucer-shaped fungi, with their spore-producing cells immersed in



Periza badius, the brown species

the flesh of the disk, the exterior scurfy or warty, and usually some tint of brown. A common form, *P. vesiculosa*, is found on manure heaps and rich cultivated ground.

Pfäfers OR BAD PFÄFERS. Swiss bathing establishment. It is $2\frac{1}{2}$ m. by road S. of Ragatz (*q.v.*) in the canton of St. Gall. In the romantic gorge of the Tamina, alt. 2,235 ft., it has a saline spring, efficacious in nervous, rheumatic, and scrofulous disorders. The spring was discovered in 1038, and the first bathhouse was built in 1242. The Benedictine abbey of Pfäfers, founded about 724, was rebuilt in the 17th century; it was converted into a lunatic asylum in 1847.

Pfennig. Coin of the German currency. It represents the one-hundredth part of a mark (*q.v.*), and normally copper coins of 1 and 2 pfennig value were issued. Iron pieces of 5 and 10 pfennigs were coined in 1915, aluminium pieces of 1 and 50 pfennigs in 1916 and 1919 respectively, and zinc pieces of 10 pfennigs in 1917. See Penny.

Pfleiderer, Otto (1839–1908). German theologian. Born at Stetten, Sept. 1, 1839, and educated at Tübingen and at British universities, he became a pastor at Heilbronn. He was appointed professor of theology at Jena in 1870, and at Berlin in 1875. He was Gifford lecturer in 1894. His theology was of the rationalistic type and his works include *The Development of Theology since Kant*, 1890, and *Evolution and Theology*, 1900. He died July 19, 1908.

Pforzheim. Town of Baden, Germany. It stands at the union of the Nagold and the Enz, 16 m. from Karlsruhe, and is a rly. junction. The chief buildings are the town hall, the church, in which are tombs of some of the margraves of Baden, and the palace in which those rulers lived. The chief industries are the making of jewelry and gold and silver ornaments; others are the manufacture of machinery, chemicals, paper, and beer. A Roman settlement, Pforz-

heim became part of Baden, and from 1300 to 1565 was the residence of the margraves. Reuchlin was born here. Much erudition has been bestowed upon a story that, in 1622, after the battle of Wimpfen, 400 of its citizens gave up their lives for their ruler, but it is now believed to be fiction. The town stands on the N. edge of the Black Forest. Pop. 69,000.

Phaeacians. People represented in the *Odyssey* as inhabiting the island of Scheria in the farthest W. Their king Alcinous (*q.v.*) hospitably entertained Odysseus. The Phaeacians lived in much luxury, and their name became proverbial for persons of self-indulgent disposition.

▼ **Phaedo**. Greek philosopher. A native of Elis, he made the acquaintance of Socrates at Athens. After the death of the latter, he returned to his native place and set up a Socratic school. He is chiefly remembered in connexion with Plato's dialogue on the immortality of the soul, which bears his name.

Phaedra. In Greek mythology, daughter of Minos, king of Crete, and wife of Theseus, king of Athens. She took her own life because the passion she had conceived for her stepson, Hippolytus, was not returned by him. See Hippolytus.

Phaedrus. Latin fabulist. A Macedonian slave freed by the emperor Augustus, he published a collection of about 100 fables and occasional pieces. The fables, partly imitated from Aesop (*q.v.*), have had wide use as a schoolbook.

Phaestus. Ancient city of Crete. It is 25 m. S.W. of Candia, on a ridge commanding the rich plain of the Messara, and was occupied from Neolithic to Venetian times. Ruins of a great palace, second only to Knossos (*q.v.*), were excavated from 1900 onwards. Beneath the palace, built about 1800 B.C., are the remains of an earlier one. Two miles away, at Hagia Triada on the same ridge, is a small palace of about 1600 B.C., where rich finds were made of inscribed tablets, frescoes, seals, and steatite vases, with realistic reliefs of a harvest procession, games, etc. See Crete.

Phaestus Disk. Clay tablet, now in the Candia Museum, Crete. Discovered in a subterranean

palace-chamber at Phaestus in 1908, it is attributed to the latest Middle Minoan period. Nearly 7 ins. in diameter, it bears on both sides in spiral lines 241 pictorial characters printed from 45 stamps. The pictures include a mastless galley and seamen with close-fitting caps, of northern origin. The script, non-Egyptian and mostly non-Minoan, awaits full decipherment; Evans has suggested that it may be a religious chant. See Alphabet; Clay Tablets.

Phaethon (Gr., shining). In Greek mythology, the son of Helios, the sun-god. Attempting once to drive his father's chariot across the skies, he proved too weak to control the spirited horses, with the result that he came so near to earth that a portion of it was burned, the parched condition of the Sahara being attributed to this mishap. Thereupon Zeus killed the presumptuous youth with a thunderbolt, and he fell into the river Eridanus.

Phaeton. High, four-wheeled open carriage, for one or two horses. Invented in the second



Phaeton. Four-wheeled mail phaeton drawn by two horses

half of the 18th century, and named after Phaethon, it had long popularity as a showy equipage for fashionable whips, until largely superseded by the landau and victoria.

Phagocytes (Gr. *phagein*, to eat; *kytos*, a vessel). Name given to the white corpuscles of the blood. See Blood.

Phagocytosis. Destruction of micro-organisms by the phagocytes or white corpuscles of the blood. See Blood.

Phalangeridae (Gr. *phalanges*, bones of the fingers or toes). Family of small marsupials of arboreal habit, found only in Australasia, where they are falsely called Opossums. Phalangers are distinguished by the peculiar construction of the hind feet. The first toe has no nail and can be opposed to the others like a

thumb, while the second and third toes are enclosed in a common skin; the foot being much like that of certain of the kangaroos. All the phalangians have thick, woolly coats, and with the exception of one species have long tails, often more or less prehensile. They move about the trees by night and feed mainly on fruit and leaves; but some of the species are practically omnivorous. The koala (*q.v.*) belongs to this family, though it has little outward resemblance to its relatives; and among the phalangians we find the only marsupial that has the power of gliding flight. See Flying Phalanger.

Phalanx (Gr.). Tactical formation of infantry introduced by Philip of Macedon and perfected by Alexander the Great. The Macedonian spearmen, armed with very long spears, were arranged many ranks deep, so that a large number of spears projected beyond the first line. With this formation the charge was made, and the impact found irresistible. Alexander's great victories over the Persians at Issus, 333 B.C., and Arbela, 331 B.C., were largely due to the employment of the phalanx. At the beginning of the second century B.C. the Romans came into conflict with the Macedonians, and the loose formation of the legionaries, armed with short swords, was pitted against the hitherto invincible phalanx. The Romans checked-mated the phalanx by giving it no opportunity to charge, by luring it on to broken ground, and by breaking it up with missiles. The efficacy of these tactics was proved by the signal victories of the Romans at Cynoscephalae in 197 B.C., and later at Pydna in 168. After Pydna the phalanx is not heard of again.

Phalaris (d. c. 554 B.C.). Tyrant of Agrigentum, in Sicily. Notorious for his cruelty, he is said to have roasted his victims in a brazen bull, invented by Perillus of Athens, who is said to have suffered death in it himself. He held power for about 16 years, at the end of which he was overthrown in a revolt, and is reported to have been roasted in his own brazen bull. The Letters attributed to him were proved by Bentley (*q.v.*) to be forgeries.

Phalarope (Gr. *phalaris*, coot; *pous*, foot). Small, migratory shore bird related to the snipe. Two species occur in Great Britain, the red-necked phalarope (*Phalaropus lobatus*) and the grey phalarope (*P. fulicarius*). The former has plumage of grey and white, with a chestnut neck, and breeds in

the Hebrides and the Shetlands, nesting on the ground among the heather. The grey phalarope is an irregular winter migrant to the S. coasts of England.

Phalerum. Former port of Athens, now a seaside resort. It stands on a bay about 3 m. from the town. Up to the time of the Persian wars it was the chief port. Pron. Fa-leerum. See Athens.

Phallism OR **PHALLIC RITES** (Gr. *phallos*, the virile member). Usages and rites concerned with the reproductive forces of nature, as symbolised by the organs of sex. Phallic worship, in the sense of veneration of the symbols or of the deities and powers symbolised, is rarely found. But phallism as a form of ritual magic, widespread in antiquity, still pervades primitive culture throughout the world.

In the magico-religious phase of man's emotional life the belief that the fertility of crops and herds could be assured by means of sympathetic magic induced practices, generally at seasonal festivals, which are loosely embraced under the designation of phallism. They apparently arose among settled neolithic peoples, especially in the regions which gave birth to the Hamitic and Semitic stocks. They survived in dynastic Egypt in connexion with the cult of Min and Osiris, and in W. Asia in connexion with that of Cybele, Atargatis, and Baal. The Greek cult of Dionysus and the ithyphallic (Gr. *ithys*, straight) statues of Hermes at Athens were aboriginal and non-Hellenic. Similarly, Indian phallism is Dravidian rather than Aryan. See Lingayat.

Phalsbourg OR **PFALZBURG**. Town of France, in Lorraine, in the dept. of Moselle. It is 8 m. N.W. of Saverne. Formerly a fortress, it held out against the Germans for four months in 1870. Pop. 4,000.

Phaltan. Native state and town of India, in the Satara agency, Bombay province. The state is bounded on the N. by the Nira river, and lies E. of the rly. from Poona to Belgaum. Timber and native food grains are the chief products; coarse textiles are manufactured. Its area is 397 sq. m. The town is in the middle of the state, 52 m. S.E. of Poona. Pop., state, 56,000; town, 5,000.

Pharaoh. Kingly title in ancient Egypt. The English spelling is derived from the grecised and hebraised forms of the Egyptian Per-o, great house. In the pyramid age this term denoted the royal estates, and during the Middle Kingdom tended to be used symbolically. With the new empire it became a personal title, and in

Shishak's time accompanied the personal name. The O.T. references to later monarchs, as Pharaoh-Necho and Pharaoh-Hophra, were therefore strictly accordant with contemporary usage. Thereafter Pharaoh came to denote colloquially the reigning king, just as the Sublime Porte designates the sultanate of Turkey.

The identification of the pharaohs of the O.T. anterior to Shishak—the first mentioned by name—is still undetermined. The pharaoh to whom Joseph was vizier was apparently a Hyksos king, regarded by late classical tradition as one of the Apepis. The pharaohs of the Hebrew oppression and exodus from Egypt have long been identified with Rameses II and Merenptah, but the evidence of the Amarna tablets and the Israel stela inclines many scholars to displace these identifications in favour of Thothmes III and Amenhotep II. The daughter of Pharaoh whom Solomon wedded was apparently a daughter of Pasebkhnut II, last of the XXist dynasty. See Aaron; Egypt.

Pharaoh's Serpent. Chemical toy. It consists of mercury thiocyanate (sulphocyanide) made into small cones or pills, by means of mucilage of tragacanth. When the pharaoh's serpent is lighted, it forms a long, bulky mass, resembling a serpent. This is due to the decomposition of the mercury sulphocyanide by the heat into mercury vapour and a substance known as mellone. The vapour given off is poisonous.

Pharisees (Heb. *parush*, separated). Religious party among the Jews. They sprang from the Chasidim (*q.v.*), during the Maccabean wars, and were originally the patriots of the nation, who insisted on the permanent separateness of the Jews from the Gentiles, and upon the eternal and unchanging authority of the law of Moses. Often called Chaberim (scholars), they were collectors of the teachings and traditions of the Rabbis, in contrast with the Sadducees, who maintained that the individual conscience is superior to the teachings of anyone, and that the simple letter of the law is all that is needed for the guidance of the individual. In the time of Christ, as the champions of Jewish nationalism they were politically opposed to the Sadducees and Herodians; but all were agreed in their opposition to the teaching of Christ. The Pharisees became rigid formalists. In the final struggle of the Jews for national existence, the Zealots represented the militant section of the Pharisees. See Jews.

Pharmaceutical Society. British society. It was established in 1841 for the purpose of advancing chemistry



Pharmaceutical Society arms

and pharmacy, for promoting the education of those who practise the same, and for the protection of persons who carry on the business of chemists and druggists. A royal charter of incorporation was granted to the Society in 1843. Under the Pharmacy Acts the society conducts an examination in materia medica, pharmacy, etc., qualifying persons for registration as pharmaceutical chemists, or chemists and druggists, and institutes proceedings against persons who contravene the Pharmacy Acts. It advises the Privy Council as to additions to, or changes in, the Poison Schedule. It publishes *The Pharmaceutical Journal*. The offices are at 17, Bloomsbury Square, London, W.C.

Pharmacopoeia (Gr. *pharmakon*, a drug; *poiein*, to make). Authoritative treatise on the preparation, constitution, and dosage of drugs and medicines. The British Pharmacopoeia is issued by the General Medical Council, and is revised from time to time. It first appeared in 1864, and took the place of the London Pharmacopoeia which had been first published in 1618.

Pharmacy. Greek word meaning originally the use of drugs. It appears to have been at first practised by priests, this being the case in Egypt and among the Jews, and later in Europe it was largely in the hands of monks. In course of time more became known about the use of drugs, but for long a great deal of superstition was mingled with the art. In the 17th century the word began to be used for the compounding of medicines, and the work of the chemist became quite distinct from that of the medical man. After 1852, in Great Britain, registered chemists were distinguished from unregistered ones, since when the former have been known as pharmaceutical chemists. See Chemist; Dispensing.

Pharos. Western extremity of the city of Alexandria. Formerly an island, it was joined to the city by a causeway which divided the harbour into two portions. Here stood the ancient Pharos, or lighthouse, accounted one of the seven wonders of the world, built under Ptolemy II, about 260 B.C., and reaching a height of about 500 ft. The site of the old lighthouse was

later occupied by the picturesque Fort Kait Bey. See Alexandria; Lighthouse.

Pharsalus. Town of ancient Greece, in the dist. of Pharsalia, Thessaly. Situated near the river Enipeus, it was the scene of fighting during the war between Rome and Macedonia (197 B.C.). There are many ruins of the ancient walls and of the Acropolis.

The battle of Pharsalus was fought Aug. 9, 48 B.C., on the territory (Pharsalia) of the town of Pharsalus, between Caesar with 22,000 men, and Pompey with twice that number. It was the decisive battle of the civil war, Pompey's complete defeat making further organized resistance to Caesar impossible. See Lucan.

Pharynx (Gr., throat). Cavity extending from the base of the skull to the level of the cricoid cartilage of the throat, where it becomes continuous with the oesophagus or gullet. About 4½ ins. long, it lies behind the mouth and nose, and thus forms the passage through which food passes from the mouth to the oesophagus, or air between the mouth and nose and the larynx. The Eustachian tubes (*q.v.*) open into the upper part of the pharynx, one on each side. Inflammation of the pharynx is known as pharyngitis. Acute pharyngitis may be the simple sore throat of a common cold, or may be due to more serious infection from scarlet fever, diphtheria, etc. Chronic pharyngitis or "clergyman's sore throat" is a condition met with in speakers, costermongers, and others, resulting from over-use of the voice. It is often associated with excessive smoking and drinking. Treatment demands rest of the voice and abstinence from smoking and alcohol. Astringent sprays containing menthol may be prescribed. See Anatomy; Man.

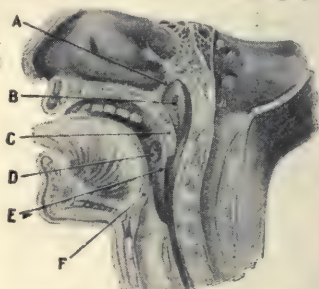
Phase. Term used by electrical engineers to denote the time relationship between the voltage of an alternating electric current and the current impulse. In an alternating current it is seldom that the current attains its maximum and zero values at the same instant as the voltage. Thus electrostatic capacity in the circuit causes the currents to lag behind the volts, whilst inductance, i.e. the induced counter electromotive force, causes the currents to lag behind the volts. The extent of the time difference measured on the zero line is known as the phase, and is usually measured by a theoretical angle termed the angle of lag.

Phase (Gr. *phasis*, appearance). In astronomy, term used for the different luminous appearances of

the moon and certain planets. The well-known phases of the moon are caused as the moon travels in its orbit about the earth, thus altering the amount of the illuminated surface which is seen.

The phases of the inferior or inner planets, Mercury and Venus, are similar to those of the moon, but take a complete Mercurial or Venusian year for their accomplishment. The crescent Venus or Mercury occurs as the planets come more and more in line between the earth and the sun. It is at these times, unfortunately, when the planets are nearest the earth that less of the surface becomes visible, making accurate astronomical observations difficult. See Moon.

Ph.D. (Philosophiae Doctor). Abbrev. for Doctor of Philosophy.



Pharynx. Section of throat showing position of the pharynx. A. Posterior edge of nasal septum. B. Orifice of Eustachian tube. C. Soft palate. D. Palatine tonsil. E. Pharyngo-palatine arch. F. Epiglottis

Pheasant. Family (Phasianidae) of game birds greatly esteemed for the table. The family includes over 50 genera, and comprises the partridges, quails, domestic poultry, guinea fowl, and peafowl. The typical pheasants, to which belongs the common pheasant of British woods, form the genus *Phasianus*, including over a dozen species.

In a wild state the true pheasants range from S.E. Europe across Central and S. Asia to Japan, and are usually found in wooded valleys. In structure they have much in common with the partridge, but with a long and wedge-shaped tail.

The common pheasant (*Phasianus colchicus*) is a native of Turkey, Greece, and Asia Minor, and is believed to have been introduced into Britain by the Romans. It has, however, been freely interbred with other species introduced later, notably the ring-necked pheasant (*P. torquatus*) from China and the green pheasant (*P. versicolor*) from Japan.

The pheasant feeds upon insects and snails, in addition to seeds, grain, and berries. It will flourish in the coverts without attention if

protected from foxes and poachers. It is polygamous in habit. About a dozen eggs are laid by each hen in April, the nest being placed under a bush, among stubs in coppice, or in the heather. The hen sits well enough if undisturbed, but, in order to make sure, it is the practice of gamekeepers to collect the eggs and set them under domestic hens. The chicks are thus practically reared by hand, their food being regularly provided and no inducement given them to stray far from the place of their hatching.

As with other varieties of game bird shooting, it is now the practice to drive the birds towards the guns by means of beaters, rather than to walk them up over dogs. A few dogs may be usefully employed in picking up wounded birds, but dogs in a big day's pheasant shoot are now seldom in evidence. The birds should be driven away from home. Many varieties of sporting shots may be obtained in pheasant shooting, especially at high-flying birds. The pheasant shooting season lasts from Oct. 1 to Feb. 1, inclusive. See *Argus Pheasant*; *Beak*; *Birds, colour plate*; consult also *A Monograph of the Pheasant*, 4 vols., W. Beebe, 1918.

Pheasant's Eye or **BIRD'S EYE** (*Adonis annua*). Annual herb of the natural order Ranunculaceae. A native of Europe (rare in Britain), W. Asia, and N. Africa, it has short, branching stems, with numerous much-divided leaves, the segments reduced to threads. The flowers are nearly globular. The sepals are like petals, but greenish, and the petals crimson with a darker spot at the base, which constitutes the pupil of the eye indicated by the name. The name bird's eye is usually associated with the bird's-eye primrose (*Primula farinosa*), and pheasant's eye is also applied to the poet's narcissus. See *Narcissus*.

Pheidias (c. 490–432 B.C.). Sculptor of ancient Greece. Born at Athens, the son of Charmides, he studied in the school at Argos under Ageladas. On his return to Athens he was employed on the famous statue of Athena Parthenos, and, his great gifts being appreciated by Pericles, he became superintendent of all the artistic undertakings carried out during the latter's administration. Thus he directed the execution and decoration of the whole group of buildings on the Acropolis. Later he was accused of impiety for having sculptured his own likeness on the shield of Athena Parthenos, and of misappropriation of the treasure entrusted to him, and is said either to have died in prison or to have fled to Elis, where he



Pheasant. Cock of the common variety of the game bird

W. S. Berridge, F.Z.S.

executed the chryselephantine (*q.v.*) statue of Zeus for the Eleans. See *Acropolis, colour plate*.

Pheidon. King of Argos, who probably flourished towards the end of the 7th century B.C. He was an energetic ruler, who enlarged the boundaries of Argos, reduced Corinth and Aegina to the position of vassals, and seems to have contemplated the subjection of the whole of Peloponnesus. He introduced a new standard of weights and measures, and had a mint at Aegina, where silver money, according to some ancient authorities, was first coined. He checked the encroachments of the Dorian oligarchs on the royal prerogatives. He is said to have been killed in battle at Corinth.

Phelps, SAMUEL (1804–78). British actor. He was born at Devonport, Feb. 13, 1804, and made his first London appearance as Shylock at The Haymarket, Aug. 28, 1837. For the next five years he played with Macready at Covent Garden and Drury Lane. On May



Samuel Phelps, British actor

27, 1844, he opened Sadler's Wells Theatre with *Macbeth*, and gave his last performance there, March 15, 1862, having produced in the interval no fewer than 31 of Shakespeare's plays and made the theatre a power in the dramatic world. A capable tragedian and comedian, he was seen to best advantage as Sir Pertinax Mac-Sycophant in Macklin's *Man of the World*. He died Nov. 6, 1878. See *Life*, W. M. Phelps and J. Forbes-Robertson, 1886.

Phenacetin. Colourless crystals, one of the coal-tar derivatives. Sparingly soluble in water, tasteless and odourless, it is frequently

employed to relieve headache, neuralgia, migraine, and the pains of sciatica and locomotor ataxia.

Phenacite. In mineralogy, name given to beryllium orthosilicate. Grey, yellow, to pale red in colour, transparent usually though sometimes translucent, the mineral is found in the Urals, Norway, France, N. America, etc. It is cut

and polished as a gem stone, the colourless varieties resembling diamonds when cut. The name of the mineral is derived from the Greek *phenax*, a deceiver, from the fact that the mineral is very similar to quartz in appearance and likely to be mistaken for it.

Phenazonum or **ANTIPYRIN**. White crystalline powder used to relieve pain, headache, neuralgia, sciatica, etc. It is soluble in water, alcohol, and ether. The heart may be injuriously affected by it, and it is now little employed.

Phenol or **PHENYL ALCOHOL**, C_6H_5O . Scientific name for carbolic acid (*q.v.*).

Phenolphthalein. Crystalline substance obtained by heating phenol with phthalic anhydride and sulphuric acid, the product being afterwards purified. It is used under various names as an aperient. In chemical analysis phenolphthalein is employed as an indicator, because with alkalis a distinctive pink colour is obtained.

Phenomenalism. Theory which considers that only the phenomena directly presented to us, or the ideas that we derive from them, are real. In the one case it is realistic, in the other idealistic. There are no things-in-themselves, behind, and the cause of, the phenomena, which are really what they appear to us to be. See *Metaphysics*; *Sensationalism*.

Phenomenon (Gr. *phainomenon*, that which appears). Term in metaphysics, denoting that which appears to the senses, conditioned by space and time, as contrasted with that which is apprehended by the mind. It is not the real thing, but only the thing as it appears to us. The term is also applied to any remarkable person or thing, *e.g.* an infant phenomenon.

Pheon. In heraldry, a large arrow head, with the inner edge of the barb serrated. It differs from a bird bolt, which is an arrow head with a blunt end.



1. Broad Street station of the Pennsylvania Railroad Company. 2. Girard National Bank, 1795, the oldest bank building in America. 3. State House or Independence Hall, where the historic Declaration was

signed, July 4, 1776. 4. House of William Penn, in Fairmount Park. 5. The U.S. Mint. 6. Carpenters' Hall. 7. The City Hall, which has a statue, 36 ft. high, of William Penn, surmounting the spire

PHILADELPHIA, U.S.A.: PROMINENT BUILDINGS IN PENNSYLVANIA'S HISTORIC CITY

Pherecydes (c. 550 B.C.). Greek philosopher, sometimes included among the Seven Wise Men of Greece. He is reckoned the creator of Ionic prose. According to him, Zas (Zeus), Chronos (Time), and Chthonië (Earth) had existed from the beginning, and the world was the result of the working of Zeus and Chronos upon earth. It consisted of five elements—ether, fire, air, water, and earth. Pherecydes is said to have been the teacher of Pythagoras, and to have first enunciated the doctrines of metempsychosis and the immortality of the soul. *Pron.* Pherry-si-deez.

Phi Beta Kappa. Oldest college fraternity in the U.S.A. It originated as a secret social club and literary society, Dec. 5, 1776, at William and Mary College, Williamsburg, Virginia. Chapters were established at Yale in 1780, Harvard in 1781, and Dartmouth in 1787. It now includes nearly 100 additional chapters with a membership of about 28,000. Women

were admitted in 1875. The society is controlled by a national council, and includes both past and present graduates in arts and science. The badge is in the form of a key inscribed on the obverse with the Greek letters $\Phi \beta \kappa$ (representing *Philosophia Bion Kubernêtes*, Philosophy the guide of life), and a hand pointing to a group of stars; and on the reverse with the letters S.P. (*Societas Philosophiae*), the date Dec. 5, 1776, names of owner and college, and date of the owner's graduation. The society issues a quarterly magazine, *The Phi Beta Kappa Key*.

Phi Beta Kappa.
Badge of the
fraternity

the old form which covered the whole body. *See* Highlands.

Phigalia. City of Arcadia, in ancient Greece, on the borders of Messenia. Frequently mentioned by ancient writers, it is chiefly noted for the famous temple of Apollo Epikourios, at Bassae, in its territory about six miles away. The remains of the temple, which was built by Ictinus, the designer of the Parthenon, and was considered the most beautiful temple in the Peloponnese, are in an excellent state of preservation. The frieze, representing combats of Greeks with Amazons and Centaurs, is now housed in the British Museum. Phigalia is the modern Pavlitza.

Philabeg OR **FILBEG.** Kilt of Scottish Highlanders. The word is derived from the Gaelic *feilidh*, kilt, *beag*, small, as distinguished from



Philadelphia. Plan of the central part of the city, showing the railway communications and the principal quays on the Delaware River

the old form which covered the whole body. *See* Highlands.

Philadelphia. Ancient city of Lydia, Asia Minor. Founded by Attalus Philadelphus, king of Pergamum about 140 B.C., it is now represented by the walled city of Ala-Shehr at the N.E. base of Mt. Tmolus, 80 m. by rly. E. of Smyrna. *See* Ala-Shehr.

Philadelphia. City and port of U.S.A. It stands on the right bank of the Delaware river, 96 m. from its mouth, and 90 m. by rly. from New York. Built on an almost level plain, it covers nearly 130 sq. m., and is intersected by the Schuylkill river.



Philadelphia arms

Innumerable small homes are a characteristic of Philadelphia. Two and three storeyed houses of red brick, with white marble steps, run for miles along straight, tree-shaded streets. Broad Street bisects the city from N. to S., and where Market Street cuts it at right angles is City Hall Square. The chief wholesale houses occupy Market Street, and just S. of it is Chestnut Street with the best retail stores and the principal newspaper offices. Rittenhouse Square to the S.W. of the city Hall is the aristocratic quarter, although many fine residences have been built in the N. section of Broad Street.

William Penn, in 1682, founded Philadelphia as a Quaker colony, absorbing a small Swedish settlement of 1632. In revolutionary



1, 2, and 3. Views before the erection of the Assuan Dam, which partially submerged the ruins. 3. From the Cataract, standing on the right bank of the Nile. 2. From the left bank. 3. Left, ruins of the Temple of Isis; right, the Kiosk, called Pharaoh's Bed. 4. Pharaoh's Bed since submersion. 5. Forecourt of Temple of Isis, since submersion.

PHILAE: PARTIALLY SUBMERGED RUINS ON THE SACRED ISLAND OF THE NILE

days it was the political centre of the young republic. In Independence Hall the Declaration of Independence was signed, and the Continental Congress sat. Here is the Liberty Bell, which announced that the declaration had been adopted. Close by is the old Congress Hall, the first regular home of congress, where Washington pronounced his farewell address, and a few streets away are Carpenters' Hall, belonging to the Carpenters' Guild, where the first steps in the revolution were taken in 1774, and the old house, 239, Arch Street, where Betsy Ross made the first American flag. Franklin is buried in the graveyard of Christ Church, which has colonial as well as revolutionary memories, and the Old Swedes' Church of Gloria Dei occupies the site of a wooden one built in 1646. The Penn Treaty Park, in Beach Street, commemorates the elm under which, in 1682, Penn made his bargain with the Indians.

The city's intellectual activity has created many noted institutions, among which are the Pennsylvania Academy of Fine Arts, the Library Company, Bartram's Botanical Garden, the American Philosophical Society, the Academy of Natural Sciences, and the Pennsylvania Historical Society.

To-day, Philadelphia is a busy industrial and commercial city. Its City Hall or Public Buildings, an immense white marble structure in the French Renaissance style, covering $4\frac{1}{2}$ acres, with a tower 537 ft. high, surmounted by a statue of Penn, houses the state law courts as well as the municipal offices. The Masonic Temple, with its 250-ft. tower, is also in City Hall Square. In Chestnut Street are the Free Library and the Post Office with the Federal Building, and the U.S. law courts. Walnut Street contains the Stock Exchange, with a fine semi-circular portico, and the Girard Bank.

The private art collections of Philadelphia are famous. The public gallery of the Pennsylvania Academy of Fine Arts is in North Broad Street, close to which is the granite and marble building of the U.S. Mint, established here in 1792. Two great railways, the Pennsylvania and the Philadelphia and Reading, have their head offices in the city, and Cramp's Shipyards and the Baldwin Locomotive Works are among the most noted industrial establishments of the country. The U.S. Navy has a yard on League Island. The city's 30 m. of river front give it splendid dock facilities. The University of Penn-

sylvania, with 10,000 students, occupies 60 acres on the W. bank of the Schuylkill, and is famous for its medical, dental, and law schools. Girard College educates 1,500 poor male orphans according to the will of Stephen Girard (d. 1831), but admits no clergyman to its grounds, and the Drexel Institute, founded in 1892 by A. J. Drexel, specialises in industrial education.

Fairmount Park, Philadelphia's one big park, lies to the N.W. and contains Mount Pleasant, the country home of Benedict Arnold, and some of the buildings of the Centennial Exhibition of 1876. The population of Philadelphia in 1920 was 1,823,158, and was remarkable among those of big American cities for its large proportion of native-born Americans. See History of Philadelphia, J. T. Schärff and T. Westcott, 1884; Memorial History of the City of Philadelphia, J. H. Young, 1895.

L. R. Holmes

Philadelphians. Name, meaning lovers of the brethren, assumed by a sect founded late in the 17th century by John Pordage, rector of Bradfield, Berkshire, and a lady named Jane Lead. Their object was to put into practice the mysticism of Jacob Boehme, and they taught a form of theosophical pietism, which made contemplation the basis of religious knowledge and life. They seemed to have inclined to spiritism, and apparitions of good and evil spirits were a prominent feature in their supposed experience. See Boehme; Mysticism.

Philaë. Small island in the Nile near Assuan, celebrated for its exquisite temples. Here are the small unfinished Roman hall colloquially called "Pharaoh's Bed," and two Ptolemaic structures, the Temple of Hathor and the great Temple of Isis. These buildings are now wholly submerged from November to June in each year owing to the building of the dam at Assuan. See Assuan; Nile.

Philately (Gr. *philein*, to love; *ateleia*, freedom from tax). Collection and study of postage stamps, stamped envelopes, or the like. See Stamp Collecting.

Philemon (c. 360-262 B.C.). Founder of what is known as the New Greek Comedy. A native of Soli, in Cilicia, or of Syracuse, he spent most of his life in Athens. He was the contemporary and rival of Menander, to whom he was generally preferred by the Athenians. He wrote 97 plays, of which The Ghost, The Merchant, and The Treasure were adapted by Plautus in his *Mostellaria*, *Mercator*, and *Trinummus*. See Comedy; Menander.

Philemon. Friend and disciple of S. Paul. To him the apostle addressed one of the epistles belonging to the group known as the epistles of the captivity. In it he is described as a fellow worker. It is concerned with a runaway slave of his, who had become one of S. Paul's converts. The slave, Onesimus, had wronged his master and been unprofitable, and S. Paul sends him back, though he would like to keep him, and pleads for his forgiveness.

This epistle is of special interest in that it touches upon the problem of slavery, but it has been rightly pointed out that it is not an abolitionist pamphlet. Slavery is not forbidden, but is to be regulated by the Christian principle of brotherhood. The epistle is included in the Muratorian canon and the canon of Marcion. It would seem to have been written in Rome between about A.D. 60 and 62.

Philemon and Baucis. In Greek legend, the names of a humble and aged couple living in Phrygia, who, when Zeus and Hermes visited the earth in human form and could find no one to give them hospitality, kindly received the two gods. As a reward Zeus changed their cottage into a temple, and ordained that when they died they should die together, so that one should not have the pain of surviving the other. The story is told by Ovid in his *Metamorphoses*, bk. 8. *Philemon et Baucis* is the title of a poem by La Fontaine, and of a three-act comic opera by MM. Carré and Barbier, 1860, for which Gounod wrote the music.

Philharmonic Society. Association for the encouragement of music, mainly orchestral. The chief and oldest is the Royal Philharmonic Society of London, founded in 1813, the full story of which is told in the History of the Philharmonic Society of London, 1813-1912, by Myles B. Forster. At its centenary it was granted the right to prefix the word royal to its title. Similar societies have been founded in Liverpool, New York, Brooklyn, and in many other places, under slightly differing names.

Philip. Masculine Christian name. A Greek word, it means lover of horses. The French form of the name is Philippe and the German Philipp. There is a feminine Philippa.

Philip. One of the apostles. A native of Bethsaida, it was he who estimated the cost of feeding the hungry multitude that had come some distance to hear Christ preaching (John 6).

Philip. One of the seven deacons selected by the apostles to relieve them of the work of caring for the poor. He preached for a time in Samaria, and baptized an Ethiopian eunuch of Queen Candace's court (Acts 8).

Philip I (1052-1108). King of France. The eldest son of King Henry I, he was named after Philip of Macedon, from whom his mother, a Russian princess from Kiev, claimed descent. In 1059 he was crowned as his father's successor; in 1060 he became sole king; and in 1066 his personal rule began. Though hardly as powerful as some of his vassals, he added much to the effective area of his little kingdom in a series of wars with the rulers of Normandy, Anjou, and Flanders, and other

repudiated her, 1193, marrying Agnes of Meran in 1196. France was therefore laid under an interdict in 1200 until Philip took Ingeborg back. Claiming the French possessions of John of England, Philip conquered Normandy, Maine, Anjou, Touraine, and Poitou, 1204-6, and by joining in the crusade against the Albigenses gained a footing in S. France. Intervening in German affairs, he supported the Flemish communes, with whose aid he won the great victory of Bouvines over the emperor Otto IV, England, and Flanders, 1214. His position being now assured, he reformed the administration, and improved the city of Paris. He died July 14, 1223. *See* Philip Augustus, W. H. Hutton, 1896.

persecutor of his enemies. *See* La France sous Philippe le Bel, E. Boutaric, 1861; Cambridge Modern History, vol. 1, 1902.

Philip V (c. 1294-1322). King of France. A younger son of Philip IV, he became king in Nov., 1316. For a few months he had been regent of France, waiting for the birth of a posthumous son to his brother, Louis X, but the child only lived a few days. His rival was Jeanne, a daughter of Louis, but the succession of a woman was disliked and Philip secured the throne. During his short reign he did much for France by way of useful legislation. A man of some culture, he died Jan. 2, 1322. He married, but left no sons, his successor being his brother, Charles IV. Philip is known as the Tall.



Philip, kings of France. Left to right: Philip I, 1059-1108; Philip II, 1180-1190; Philip III, 1201-1213; Philip IV, 1285-1314; Philip V, 1316-22; Philip VI, 1328-50

princes. Licentious and extravagant, his sale of ecclesiastical benefices and his bigamy led to his excommunication by Pope Urban II in 1094. He had married Bertha, daughter of Florence, count of Holland, but during her lifetime married Bertrada, wife of Fulk of Anjou. He died July 29, 1108, his eldest son succeeding him as Louis VI. *See* History of the Norman Conquest, E. A. Freeman, 3rd ed. 1887.

Philip II (1165-1223). King of France, known as Philip Augustus. Born Aug. 22, 1165, eldest son of Louis VII, he was crowned as joint king in 1197, marrying Isabella of Hainault and succeeding his father in the following year. His great work was the consolidation of the French monarchy. In a war with Flanders, 1184-85, he gained Amiens and the Vermandois, then crushed the revolt of Burgundy, and by supporting the sons of Henry II of England against their father gained Berry, 1189. Accompanied by Richard I, he joined the Third Crusade, but returned next year, took Péronne from Flanders, and in 1193 treacherously invaded Normandy. Richard I obtained the help of Flanders, Champagne, and Brittany, 1198, but his death in 1199 brought the war to an end.

Meanwhile Philip, whose first wife had died, had married Ingeborg of Denmark, and immediately

Philip III (1245-85). King of France, called the Bold. The son of Louis IX, he was born April 3, 1245, and began to reign in 1270. His personality was colourless and his reign uneventful. He was no great warrior, although, in 1284, he engaged in an unsuccessful struggle against Aragon, and this period was marked by the struggles of the various factions for the mastery. He died Oct. 5, 1285. Twice married, his successor was his son, Philip IV.

Philip IV (1268-1314). King of France, called Philip the Fair. Son of Philip III and Isabella of Aragon, he was born at Fontainebleau, married Johanna of Navarre, 1284, and succeeded his father, 1285. In 1293 he ordered Edward I of England to do homage before him, and war broke out with England, 1294-99. Having treated Flanders as a French dependency, he was utterly defeated by the Flemish at Courtrai, 1302. At this time began his great quarrel with the Papacy over the taxation of the clergy, and in 1302 he burned the bull of Boniface VIII, whom he arrested, 1303, replacing him in 1305 by his own nominee Clement V, who resided at Avignon. He suppressed the Knights Templars, 1310-14, and died at Fontainebleau, Nov. 29, 1314. Philip was a man of great personal courage, but despotic, cruel, unscrupulous, and a harsh

1197-1223; Philip III, 1270-85; VI, 1328-50

Philip VI (1293-1350). King of France, first of the Valois line. Son of Charles of Valois, brother of Philip IV, he was made regent, 1328, and in the same year became king by the Salic law. He defeated the Flemings at Cassel, 1328, and in 1329 received the homage of Edward III of England for Guienne, but the long war with England broke out in 1337. Philip suffered his greatest defeats at Crecy, 1346, and Calais, 1347, but by accession and purchase he extended his dominion to Valois, Anjou, Champagne, Brie, and the Dauphiné. But his disastrous wars and personal extravagance drained his exchequer, and he resorted to depreciation of the coinage, and to unpopular taxation. He died Aug. 22, 1350.

Philip II (382-336 B.C.). King of Macedonia. The younger son of King Amyntas, he was brought up, not in his native country, but at

Thebes (q.v.) in the brief days of her glory, when Epaminondas was the foremost man in the state. Recalled to Macedonia in 364 to act as regent for his nephew Amyntas on the death of his brother



Philip II, King of Macedonia
From a coin, by courtesy of John Murray

Perdiccas in 360 B.C., Philip carried with him the ideas of war and government, and the admiration for Hellenic culture which he had acquired in his boyhood, and the resolve to make Macedon first of Hellenic powers.

It was an easy matter to set the crown on his own head instead of that of the infant king. The next step was to bring the Macedonian army under discipline and organization which would make it a first-rate instrument of war. Philip created the Macedonian phalanx, modelled upon the infantry system of Epaminondas, and he added to it the cavalry organization which gave the combined arms an overwhelming superiority over the traditional Greek tactics. A statesman as well as a soldier, he made himself master of the coastal districts which he needed to provide him with a revenue. Meanwhile an aggressive power had arisen in Phocis (*q.v.*); an act of sacrilege on the part of the Phocians, which stirred the religious sentiment of all Hellas, gave Philip his opportunity for intervention. He crushed the Phocians, and claimed admission in their place into the Hellenic circle, 346 B.C. Athens took alarm at his growing power, when he found further pretexts for intervention in Greek affairs; the Athenians and Thebans united to oppose him, but were decisively beaten at Chaeronea, 338 B.C.

At a great congress of the Greek states, from which Sparta alone held aloof, Philip was elected captain-general in 337. At once he set about organizing the great invasion of Persia; but before he could start he was struck down by the hand of an assassin. See Philip and Alexander, D. G. Hogarth, 1897.

Philip V (c. 237-179 B.C.). King of Macedonia. On the death of his father Demetrius II, Antigonus Doson reigned until Philip reached the age of 17, when he retired in his favour. The beginning of Philip's reign was marked by a war with the Aetolians, which he conducted with great success. In 215 he concluded an alliance with Hannibal, in consequence of which the Romans formed a combination against him in 211, including the Aetolians and Pergamum. This combination kept Philip busy fighting until 205, when a peace was concluded. The



Philip V,
King of Macedonia
From a coin



Philip, kings of Spain. 1. Philip I, 1482-1506. 2. Philip III, 1598-1621. 3. Philip II, 1556-98. 4. Philip IV, 1621-65. 5. Philip V, 1700-46

3. Titian. 4. Velazquez. 5. Rigaud

war was renewed by the Romans in 200, and in 197 Philip was completely defeated by the Roman general Flamininus at the battle of Cynoscephalae. By the terms of peace concluded in the following year, Philip renounced all territorial acquisitions outside Macedonia, and agreed to pay an indemnity of £240,000 and to limit his army to 5,000 men.

Philip I (1478-1506). King of Spain. Son of the emperor Maximilian I, and Mary, daughter of Charles the Bold, duke of Burgundy, he was born at Bruges, July 22, 1478. In 1482 he became, by his mother's death, the nominal ruler of the possessions of the dukes of Burgundy, and in 1496 he married Joanna, the deranged daughter of Ferdinand and Isabella of Spain. After Isabella's death, in 1504, he and his wife were recognized as king and queen of Spain, but soon afterwards Philip died at Bruges, Sept. 25, 1506. Known as the Handsome, he was the father of Charles V.

Philip II (1527-98). King of Spain. He was born May 21, 1527, the son of the emperor Charles V. In 1543 he married Mary of Portugal, and after her death Mary I, queen of England, in 1554. In 1556 his father abdicated, transferring to him the lordship of the Netherlands, together with the crowns of Spain and of the Two Sicilies and the whole Spanish colonial empire, though the German possessions of the house of Hapsburg had already been handed over to Philip's uncle Ferdinand, who succeeded Charles as Roman emperor. On Mary's death Philip offered his hand to her sister and successor, Queen Elizabeth; but, the offer being declined, he forthwith married the French princess Elizabeth or Isabella. Philip ruled over a dominion

immensely larger than that of any other potentate; his weakness lay in the fact that its three main divisions in Europe had no intercommunication by land. He looked upon himself as the champion of the Catholic faith, but as the senior rather than the junior partner of the pope in the task of compelling the heretics of all nations to return to the bosom of the Church. His resolution never wavered, his industry was enormous, and his piety and conscientiousness were great. But his conscience did not forbid him to countenance assassination, the most portentous cruelty, double-dealing, or, indeed, any other means for attaining the ends which he had in view. His industry was marred by a total incapacity for trusting any man who showed ability; his resolution was made futile by a fatal slowness, a persistent belief that when his time came he would strike irresistibly, the result being that his time never did come, because his enemies struck first. The Netherlands revolted, and still Philip deferred an open rupture with England until he should have crushed his rebellious subjects. In 1588 he delivered what should have been his crushing blow at the island power, and his Great Armada was shattered to fragments. He died Sept. 13, 1598, confident to the last that his power would triumph. See *History of the Reign of Philip II*, King of Spain, W. H. Prescott, new and rev. ed. 1887; *Life*, M. A. S. Hume, 1897.

Philip III (1578-1621). King of Spain. Born at Madrid, April 14, 1578, the son of Philip II and of Anne of Austria, he came to the throne, Sept. 13, 1598. Of naturally weak ability, he had acquired no knowledge of public affairs. He married in 1599 Margaret of

Austria, daughter of the Archduke Charles. The duke of Lerma, who acquired the whole power of the state, provided the king with money and amusement, gave over the finances of Spain to courtiers, and pursued the grandiose policy of Philip II with insufficient and dwindling resources. Peace was indeed made with England in 1604, but the war in the Netherlands was continued until 1609.

A pious son of the Church, Philip determined to exile from Spain, in 1609, the whole Moorish population with the exception of Christians and young children. The loss of their labour ruined agriculture and commerce. Philip died March 31, 1621. Of his seven children one succeeded him as Philip IV; Fernando became a cardinal and governor of the Low Countries; Anne of Austria married Louis XIII; and Maria became the wife of the emperor Ferdinand.

Philip IV (1605-65). King of Spain. Born at Madrid on April 8, 1605, the son of Philip III and Margaret of Austria, Philip IV succeeded his father at the age of 16. Lerma was dismissed, and Philip IV, who was provided with an endless succession of amusements, leaned on the count of Olivares (*q.v.*), who, by his aggressive foreign policy, brought Spain to the verge of ruin. When at last, after the loss of Portugal and Roussillon, French armies were in Spain, Philip IV roused himself to dismiss his minister, but was incapable of sustained effort. His armies were defeated by the French under Condé at Rocroi and at Lens, and Spain was compelled to recognize the independence of the United Provinces.

Philip sought in vain in two expeditions to recover Portugal. His reign, though in other respects disastrous, was a brilliant period for art and letters, in both of which Philip IV was a real connoisseur. He died in Madrid on Sept. 17, 1665. By his first wife, Elizabeth of France, he had six children, only one of whom, Maria Theresa, married to Louis XIV of France, survived; by his second marriage, with Maria Anne of Austria, he left a son, Charles II, who succeeded him, and a daughter, Margaret Theresa, who married Leopold I of Austria.

Philip V (1683-1746). King of Spain. Born Dec. 19, 1683, he was the son of Louis, the dauphin of France, and grandson of Louis XIV. On the death of Charles II of Spain in 1700, he was declared heir to the throne of Spain and the whole of the Spanish empire. The inheritance was accepted by

Louis XIV and the result was the War of the Spanish Succession (*q.v.*). In the end Philip was recognized as king of Spain, though the Netherlands and the Two Sicilies were separated from the Spanish empire. Spanish affairs were for a short time guided by Cardinal Alberoni, whom Philip was compelled by the European Powers to dismiss in 1719; the real director of Spanish policy, however, was Philip's queen, Elizabeth Farnese. By joining in the War of the Polish Succession she obtained for her sons dominions in Italy. Philip abdicated in favour of his son Louis in 1724, but on his death a few months later re-ascended the throne. He died July 9, 1746. See *Memoirs of the Kings of Spain*, W. Coxe, 1815.

Philip (1342-1404). Duke of Burgundy, called the Bold. Son of John II of France, he was born on Jan. 15, 1342, was captured with his father at Poitiers, 1356, and was made duke of Burgundy in 1363. He married Margaret of Flanders in 1369, took part in the English wars, and having



Philip the Bold,
Duke of Burgundy
After Van Eyck

defeated the insurgent Flemings at Rosbeck in 1382, became in 1384, through his wife's inheritance, joint ruler with her of Flanders, Franche Comté, and other districts. In 1392 he became regent for Charles VI of France. He died April 27, 1404, and was succeeded by John the Fearless.

Philip (1396-1467). Duke of Burgundy, called the Good. Son of John the Fearless and Margaret of Bavaria, he was born at Dijon, June 13, 1396, and succeeded his murdered father, 1419. He made an alliance with Henry V of England, 1419, but quarrels with the duke of Bedford led to his withdrawal from the campaign, and he made peace with Charles VII, 1429. The same year he married Isabella of Portugal and instituted the Order of the Golden Fleece. He renewed hostilities, captured Joan of Arc at Compiègne, and made final peace in Sept., 1435, recognizing the king of France as his suzerain. He suppressed the insurrection of Ghent, 1448-53, supported the dauphin Louis against



Philip the Good,
Duke of Burgundy

Charles, 1456, and died at Bruges, July 15, 1467. He was a patron of learning and arts, and the founder of the university of Dôle.

Philippaugh. Battlefield in Selkirkshire, 3 m. from Selkirk. Here, Sept. 13, 1645, the marquess of Montrose was defeated by the parliamentarians under David Leslie. After routing the Covenanters at Kilsyth, Montrose was master of Scotland, and advanced to the Border. The Highlanders went home, leaving Montrose with 500 Irish and a few Borderers. Leslie marched against him from Nottinghamshire and surprised him at Philippaugh. The royalists were overwhelmed, and Montrose fled to the Highlands with a few followers. The victory was stained by a massacre of Irish prisoners and women. See *Montrose, Marquess of*.

Philippeville. Port of Algeria, forming the main entrance to the prov. of Constantine. The city, founded by the French in 1838, is entirely European in character, but stands on the site of an ancient city which has been identified with the Rusicada of the Romans. It is a terminus on the rly. system 54 m. by rly. from Constantine, handles much of the trade of E. Algeria and the Sahara, and has steamer connexion with Algiers and Marseilles. In the neighbourhood wheat, tobacco, cotton, and fruit are produced, iron is mined, and granite quarried. It was bombarded by the German cruisers Goeben and Breslau, Aug. 4, 1914.

Philippi. City of ancient Macedonia. Founded by Philip of Macedonia, it was situated on a spur of Mt. Pangaea near the river Gangas. Its gold mines are mentioned by Herodotus, but it is chiefly important historically as the scene of the battle in which Brutus and Cassius were defeated, 42 B.C., after which it became a Roman colony. One of the first Christian churches was founded here by the Apostle Paul, whose letter to the inhabitants is included in the N.T. See *Philippians*.

Philippi, BATTLE OF. Term applied for convenience to two separate battles fought in 42 B.C. near Philippi in Macedonia between the forces of Brutus and Cassius, and those of Octavian, Caesar's grandnephew and heir, and Antony. In the first battle the wing of Cassius was defeated and Cassius killed himself, while the wing of Brutus was victorious. In the second battle, 20 days later, Brutus was defeated and committed suicide, and his army was annihilated. The result of the battle was to make Octavian and Antony masters of the Roman

world. The battle forms the scene of the last act of Shakespeare's play of Julius Caesar.

Philippians. EPISTLE TO THE. One of the epistles of S. Paul, belonging to the group known as the Epistles of the Captivity. Its authenticity may be said to be fully guaranteed by external evidence. It is included in the Canon of Marcion and in the Muratorian Canon, is referred to by Polycarp, and was accepted by Irenaeus. The internal evidence is equally strong, the epistle bearing unmistakably the stamp of S. Paul's character. It is addressed from prison to the Church of Philippi, which S. Paul founded on his second missionary journey. Since the imprisonment was probably in Rome, rather than in Caesarea, the epistle may be assigned to A.D. 63. It is a very personal letter, expressing S. Paul's thanks for gifts and other friendly acts, and his great joy in the Gospel, and exhorting the Philippians to rejoice with him.

Philippics. Series of speeches delivered by Demosthenes (q.v.) from 351-341 B.C. They were so called because their purport was to warn his countrymen against the designs cherished by Philip of Macedon for the overthrow of Greek independence. The speeches contain a great deal of violent personal invective. The name *Philippics* was also given to 14 orations of Cicero against Mark Antony.

Philippine Islands. Extensive group of islands in the N. part of the East Indies, belonging to the U.S.A. They number more than 3,100, and with the Sulu Islands cover a land surface of about 115,000 sq. m. The principal islands are Luzón, Mindanao, Paragua, Negros, Panay, Samar, Mindoro, Bohol, Cebu, Leyte, and Masbate. Manila is the capital.

Mainly of volcanic origin, the Philippines are traversed by magnificent and irregular mt. ranges, well clothed with vegetation and separated by plains of great fertility, watered by innumerable lakes and rivers, which afford ample means of transport. The general disposition of the mts. is from N. to S. Parallel with the E. coast of Luzón runs the Sierra Madre, a range extending from the N. point to near Manila and averaging from 3,500 ft. to 4,500 ft. alt. On the opposite side of the island are the Caraballos Occidentales, which attain in Mt. Datá a height of 7,364 ft. Between the two ranges is the fertile valley of the river Cagayán, noted for its tobacco. Apo or Davao, 10,312 ft., an extinct volcano in Mindanao, is the culminating summit.



Philippine Islands. Map of the Pacific group ceded in 1898 to the U.S.A.

Several of the rivers and lakes are of considerable size. Cagayán, in Luzón, is the longest river, others being the Agno Grande and Abra, in the same island, and the Pulangua or Rio Grande de Mindanao and the Agusan in Mindanao. Liguasan, Buluan, and Lanao in Mindanao, and Laguna de Bay, Cagayán, and Taal, in Luzón, are the largest lakes.

The climate is tropical, but on the whole not unhealthy. Rain from the S.W. monsoon falls between June and Sept. on the W. coasts, and from Oct. the N.E. trades bring rain to the E. coasts. The mean annual temperature is 80° F. The indigenous flora is generally similar to the Malayan, with the addition of some more N. varieties, and also a few Australian genera. Large forests of teak, ebony, sandal, and other valuable woods occur, and among the economic plants are the Manila hemp, gomuti palm, pineapple, cotton, tea, coffee, cocoa, indigo, sugarcane, tamarind, and tobacco. Nutmeg, cassia, clove, and pepper also abound. Rice is cultivated, and maize, wheat, yams, bananas, oranges, lemons, and other tropical fruits are produced. The buffalo is the largest wild mammal, others being antelopes, boars, deer, and monkeys; and among domestic

animals are the horse, goat, sheep, and hog. In the woods eagles, herons, wild duck, and many other birds are found, and crocodiles infest the rivers.

Gold is one of the most valuable mineral products of the Philippines, and silver, copper, lead, iron, platinum, and manganese are worked; while among the volcanoes sulphur occurs in considerable quantities. Industries include the cultivation and manufacture of abaca or Manila hemp and the manufacture of tobacco and cigars. Pearls and edible birds' nests are a valuable item of trade with China.

According to the census of 1903 the pop. numbered 7,635,426, but this total had in 1918

increased to about 10,000,000. The Negritos, a pygmy race giving its name to the island of Negros, but inhabiting the mountainous districts of the other islands as well, are regarded as the aborigines. The bulk of the people are Malays, the chief types being Tagals in Luzón, and Visayans in the other islands. The dominant religion is Roman Catholicism.

The Philippines were discovered in 1521 by Magellan, who was shortly afterwards killed during a skirmish on Mactán Island, and were annexed by Spain in 1569, after several expeditions had been made. Manila, which became the Spanish capital in 1571, was occupied by the British, 1762-64. The islands remained a Spanish possession until 1898, when they were ceded to the U.S.A. as a result of the Spanish-American War. Aguinaldo led the Filipinos in a revolt against the Americans which was virtually ended by his capture in 1901. Later a movement for self-government was started by the Filipinos.

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Philippopolis, Bulgaria. General view of the city, looking across the Maritza to the plains of Eastern Rumelia

Philippopolis, **FILIBI**, OR **PLOVDIV**. City of Bulgaria. Situated on the Maritza, here navigable, it was the capital of the former Turkish province of E. Rumelia, and lies about 100 m. N.W. of Adrianople. On the trunk rly. from Sofia to Constantinople, and with a branch line to Burgas, it is a considerable centre of trade, manufactures silks, woollens, leather, and tobacco, and exports grain, rice, and wine. It is the seat of a Greek archbishop and of Bulgarian and R.C. bishops, and contains some fine churches and mosques. Named after Philip of Macedon, it became in Roman times the chief town of Thrace. In 1818 it suffered greatly from an earthquake. Pop. 48,000.

Philippsburg. Town of Baden, Germany. It stands on the Sulzbach, a tributary of the Rhine, 12 m. from Karlsruhe. It began as a village named Udenheim, where the bishops of Spire had a palace. It was fortified, and during the Thirty Years' War a bishop, named Philip, strengthened its fortifications and renamed it after himself. It was taken by the Swedes and then by the French, remaining French at the peace of Westphalia in 1648. In 1679 it was given to the Empire, as it was in 1697, after having been again taken by the French. It was retaken by them in 1735. In 1803 it was made part of Baden. The town has manufactures of tobacco and cigars and a trade in cattle. Pop. 3,000.

Philippus, **MARCUS JULIUS**. Roman emperor, A.D. 244-249, often called Philip the Arabian. He was commander of the army which the emperor Gordian III led against the Persians, and incited a mutiny, as a result of which Gordian was murdered, and Philip was proclaimed his successor. He concluded an ignoble peace with the Persians and celebrated with secular games of unprecedented magnificence the 1000th anniversary of the founding of Rome (April 21, A.D. 248). He was slain at Verona by Decius (*q.v.*).

Philips, **AMBROSE** (c. 1675-1749). English poet. He was born in Shropshire and educated at



Ambrose Philips,
English poet

From a print of 1782

Shrewsbury and S. John's College, Cambridge. Philips was the author of some indifferent odes, and of a tragedy, *The Distressed Mother*, which had some success. He was friendly with Addison and Steele, but incurred the enmity of Pope, who satirises his poems in *The Dunciad*. He died in London, June 18, 1749. The word namby-pamby was coined from his name by Henry Carey (*q.v.*).

Philips, **FRANCIS CHARLES** (1849-1921). British barrister and author. Born at Brighton, Feb. 3, 1849, the son of a clergyman, and educated at Brighton College and the R.M.C., Sandhurst, he served in the 2nd Queen's Royals, 1868-71. Resigning his commission, he engaged in theatrical management, under the name of Francis Fairlie. He read for the law and was called to the bar, at the Middle Temple, in 1884. His first novel, *As in a Looking-Glass*, 1885, was immediately successful as a novel and as a play. It was translated into French, German, Spanish, and Italian. In addition to a score or so of other novels, *As in a Looking-Glass* was followed by a number of comedies, farcical and otherwise, some written in collaboration, short stories, and a volume of reminiscences, *My Varied Life*, 1914. He died April 21, 1921.

Philips, **JOHN** (1676-1709). English poet. He was born at Bampton, Oxfordshire, Dec. 30, 1676, and educated at Winchester and Christ Church, Oxford. His best known work is *The Splendid Shilling*, a mock-heroic poem which parodies the style of *Paradise Lost*. He died Feb. 15, 1709. See *Lives of the Poets*, S. Johnson, 1854.

Philipstown. Market town of King's co., Ireland. It stands on the Grand Canal, 10 m. from Portarlinton. Its early name was Dingan, the present one having been given in honour of Philip II of Spain. It was made a corporate town in the 16th century and sent two members to the Irish House of Commons until the union of 1800. Pop. 660.

Philistia (Heb. *Peleseth*). O.T. name for the land of the Philistines (Ps. lx, 8; lxxxvii, 4; cviii, 9). Elsewhere it is rendered Palestine (*q.v.*), and it does not occur in either LXX or Vulgate. The land embraced under this name included the coast plain S.W. of Palestine, from Joppa N. to the valley of Gerar S., and from the Mediterranean in the W. to the foot of the Judean hills.

Philistines. Ancient people living along the coast of Palestine. They appear to have come originally from Crete and the Anatolian coast, and established themselves in five cities in Palestine—Gaza, Ashkelon, and Ashdod on the coast, and Gath and Ekron inland. For a long period down to the reign of Saul they were the dominant race in Canaan. They were intermittently at war with the Hebrews, and were greatly reduced in power by David, but they retained their independence till their subjugation was begun by Tiglath-pileser, 734 B.C., and completed by Sennacherib, 701 B.C.

Modern research, by elucidating their racial relationships and culture, has demolished the figure of their artistic insensibility. The main evidences are the Phaestus disk (*q.v.*), the temple-carvings of Rameses III at Medinet Habu (1200 B.C.), and the Gezer and Bethshehem excavations. They dominated the neolithic inhabitants by their knowledge of metals and their early monopoly of iron. The longest Philistine skeleton from Gezer is 6 ft. 3 ins. Their social organization was

based on a confederacy of chieftains (*seren*) of early Aryan type (Judges 16). Their non-Semitic speech lingered at Ashdod down to Nehemiah (445 B.C.). (See Archaeology; Dagon; Palestine; consult also The Philistines, R. A. S. Macalister, 1913.) In the sense of a narrow-minded, uncultured person, the term Philistine became current in English through its adoption from the German by Matthew Arnold. *Philister* is a slang term used by German students for any person not a student.

Philistus (c. 435-356 B.C.). Greek historian. He was born at Syracuse, and was a close friend of Dionysius the Elder until 386, when he was banished for having secretly married the tyrant's niece. He spent the next twenty years in exile, and during that time wrote a history of Sicily, which is mentioned with warm approval by Cicero. On the accession of Dionysius the Younger in 366, Philistus returned to Syracuse, and at the capture of the city by Dion, 356, he went to Italy to raise a force, rejoined Dionysius, and was killed in a naval battle.

Phillimore, Sir Robert Joseph (1810-85). British judge. Born at Whitehall, Nov. 5, 1810, educated at Westminster and Christ Church, Oxford, and called to the bar at the Middle Temple, 1841, he obtained a considerable practice. He entered Parliament in



Sir Robert Phillimore, British judge

1852 for Tavistock, and soon acquired a reputation as an authority on ecclesiastical and international law. He was made Q.C. in 1858 and a knight in 1862. In 1867 he was appointed judge of the high court of admiralty, where he delivered many important judgements. He wrote commentaries on International Law, 4 vols., 1854-61, since revised several times. Created a baronet, 1881, he died Feb. 4, 1885.

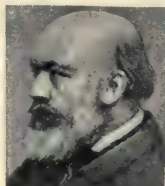
Phillimore, Walter George Frank Phillimore, 1st Baron (b. 1845). British lawyer. Born in London. Nov. 21, 1845, he was the son of Sir R. J. Phillimore, Bart. Educated at Westminster School and Christ Church, Oxford, he was made a fellow of All Souls



1st Baron Phillimore, British lawyer
Russell

and became a barrister. In 1897 he was made a judge, and from 1913-16 was a lord justice of appeal. He was created a peer in 1918. An authority on ecclesiastical law, Phillimore revised J. J. Blunt's Book of Church Law. From 1905-8 he was president of the International Law Association.

Phillip, John (1817-67). British painter. Born at Aberdeen, April 19, 1817, he came to London



John Phillip, British painter

in 1836, and studied at the Academy schools. Until 1851 he painted Scottish genre in the Wilkie manner, but in that year he made the first of his visits to Spain, after which his colour became more brilliant and his technique more individual. He was elected A.R.A. in 1857, R.A. in 1858, and died Feb. 27, 1867.

Phillip Island. Islet of Victoria, Australia. With an area of 14 m. by 6 m., it lies off the entrance to Western Port Bay. Cowes, the chief place, is on the N. coast.

Phillips, Sir Claude (1848-1924). British art critic. He became a barrister of the Inner Temple, contributed articles on art subjects to the leading reviews, and acted for many years as critic to The Daily Telegraph. As keeper of the Wallace Collection, 1887-1911, he was responsible for many improvements in that gallery, and he published monographs on Joshua Reynolds, 1894; Frederick Walker, 1894; and Watteau, 1895; also The Later Work of Titian, 1898. He died Aug. 9, 1924.

Phillips, John Serle Ragland (1850-1919). British journalist.

Born at Pendleton, near Manchester, and educated at Owens College, he became editor of The Kendal Mercury in 1878. After experience in Worcester, Belfast, York, and Newcastle, he was a leader-writer on The Scotsman, 1887-89; editor of The Manchester Examiner, 1889-91; assistant editor of The Yorkshire Post, 1891-1903; and editor, 1903-1919. A vigorous writer on literature, drama, art, economics, and politics, he was a prominent figure in the public life of Leeds. He died at Leeds, Nov. 4, 1919. He



J. S. R. Phillips, British journalist

wrote on Journalism in the 19th Century for the Cambridge History of English Literature, 1915.

Phillips, Sir Lionel (b. 1855). British financier. Born in London, Aug. 6, 1855, the son of a merchant, he settled in S. Africa,



Sir Lionel Phillips, British financier
Baines

where he became a leader of the gold-mining industry in the Transvaal, and also a prominent figure in the Uitlander agitation. He took part in the Jameson Raid (*q.v.*) of 1896, and was sentenced to death, the sentence being commuted to a fine of £25,000. As a financier he was well known as having been a member of Wernher, Beit & Co. He was five times president of the Transvaal Chamber of Mines, and in 1910 was elected a member of the legislative assembly of S. Africa. In 1912 he was made a baronet.

Phillips, Sir Percival (b. 1877). British war correspondent. Born July 2, 1877, he was educated at Pittsburg, Penn., U.S.A., and engaged in American journalism, 1895-1901. He served as war correspondent in the Greco-Turkish War, 1897, Spanish-American War, 1898, Russo-Japanese War, 1904, in the Balkans, 1909 and 1912-13, and in Tripoli, 1911. He acted as correspondent with the Belgian army from the outbreak of the Great War until after the fall of Antwerp, and in 1915 was one of the correspondents to the British Expeditionary Force, representing The Daily Express and The Morning Post until 1918. He attended the peace conference and accompanied the prince of Wales to Canada, 1919. He was made K.B.E. in 1920.

Phillips, Stephen (1866-1915). British poet. Son of Dr. Stephen Phillips, precentor of Peterborough Cathedral, he was born July 28, 1866, and educated at Stratford and Peterborough grammar schools. He went on the stage and played many parts in Sir Frank Benson's company. He afterwards became an army tutor.

The appearance of his first volume of poems, *Marpessa*, 1890, brought him exceptional popularity. He wrote



Stephen Phillips
Elliott & Fry

apparently for declamation and had no ear for lyrical measures, but his imaginative language and warm colouring took his readers by storm. Later that very experience in stagecraft, which limited his rhythms, inspired the daring originality of Paolo and Francesca, 1899, a drama in verse, the production of which by Sir Herbert Tree three years later secured the poet's triumph. If Herod, 1900, Ulysses, 1902, and Nero, 1906, glitter with too much tinsel, there was a genuine poetical beauty in the first of his poetical plays. He afterwards became over-violent in poetry and drama, and fame deserted him before his death. Later volumes of poetry include A New Inferno, 1911, and Panama, 1915. In 1905 he reappeared on the stage as the ghost to Martin Harvey's Hamlet. He died Dec. 9, 1915. A play by him in blank verse, entitled Harold, based on the story of the Saxon king, was discovered in 1921.

Phillips, WENDELL (1811-84). American abolitionist and reformer. Born at Boston, Massachusetts, Nov. 29, 1811, he was educated at Harvard. Called to the bar, he became the most prominent speaker on the abolitionist side, and was president of the Anti-Slavery Society, 1865-70. He



Wendell Phillips,
American
abolitionist

advocated state control of the sale of liquor, and reforms in penal administration and labour conditions, and took up the causes of the Indians and the Irish. He died at Boston, Feb. 2, 1884. He is considered one of America's greatest orators. See his *Speeches, Lectures, and Letters*, ed. J. Redpath, 1864, and T. Pease, 1892; *Lives*, L. Sears, 1909; C. E. Russell, 1914.

Phillipsburg. Town of New Jersey, U.S.A., in Warren co. It stands on the Delaware river, 50 m. N. by W. of Trenton, and is served by the Pennsylvania and other rlys. It has important industrial interests, the chief manufacturing establishments being foundries and machine shops, rly. repair shops, boiler and stove works, and silk mills. It was settled in 1749 and incorporated in 1861. Pop. 16,900.

Phillpotts, EDEN (b. 1862). British novelist. Born in India, Nov. 4, 1862, he was educated at Plymouth, and after ten years in an insurance office, and a trial of the stage, adopted literature as a profession. His novels, many of which are fine, intimate, dramatic studies

of Devonshire life, with especially vivid realizations of the Dartmoor country and people, include *Lying Prophets*, 1897; *Children of the Mist*, 1899; *Sons of the Morning*, 1900; *The American Prisoner*, 1904; *The Secret Woman*, 1905;



The Mother, 1908; *The Thief of Virtue*, 1910; *Demeter's Daughter*, 1911; *Widcombe Fair*, 1913; *The Judge's Chair*, 1914; *Old Delabole*, 1915; *The Spinners*, 1918; *Evander*, 1919. *The Human Boy*, 1899, is a wonderfully sympathetic study of boyhood. He also published some volumes of meritorious poems, including *Wild Fruit*, 1910, and *The Iscariot*, 1912, and collaborated with Basil Macdonald Hastings in *The Happy Ending*, *The Angel in the House*, and other plays.

Phillpotts, HENRY (1778-1869). British prelate. Born at Bridgewater, May 6, 1778, he was educated at Gloucester School and Corpus Christi College, Oxford. He



Henry Phillpotts,
British prelate

was ordained in 1802, and in 1805 was given a living in Durham. He was vicar of Gateshead, 1808-10, of S. Margaret's, Durham, 1810-20, and held the rich living of Stanhope, 1820-31. In 1828 he was chosen dean of Chester, and in 1831 bishop of Exeter. An extreme Tory, and a pronounced high churchman, "Harry of Exeter" gained notoriety owing to his re-

fusal to institute the Rev. G. C. Gorham (*q.v.*) to the living of Bramford Speke, and to his love of controversy. He won notoriety, too, as a pluralist, being canon of Durham and bishop of Exeter at the same time. He died at Bishopstowe, Torquay Sept. 18, 1869.

Philoctetes. In Greek legend, one of the heroes of the Trojan War. In his youth he was a friend of Hercules, from whom he received the arrows poisoned in the blood of the Lernaean Hydra. On the way to Troy Philoctetes received a wound in the foot, and was left behind on the island of Lemnos, where he remained till the tenth year of the war. Then, when an oracle had declared that the active help of Philoctetes was necessary in order to overthrow the city, Diomedes and Odysseus came to fetch him, and with difficulty persuaded him to accompany them to Troy. Philoctetes was made the theme of tragedies by Aeschylus and Euripides, of which only fragments remain, and of two by Sophocles, one of which is extant. *Pron.* Philoc-teeteez.

Philo Judaeus. Jewish philosopher and theologian. Born at Alexandria about 20 B.C., he studied all branches of Greek literature and Hebrew learning. The Jews of Alexandria, who had refused to worship the emperor Caligula, sent him as their advocate to Rome, in A.D. 40, and he wrote an account of his mission. Philo's theology, the influence of which has been far-reaching, teaches that the transcendent and unconditioned Deity manifests Himself in creative activity through manifold "powers" subordinated to the personal Logos (*q.v.*). Philo thus forms a link between the Platonic and Stoic doctrines, the Wisdom literature, and the theology of the fourth Gospel and S. Paul. See *Philo-Judaeus*, J. Drummond, 1888.

PHILOLOGY: THE STUDY OF WORDS

J. H. Freese, M.A., late Fellow of St. John's College, Cambridge

Other articles which may be consulted on this subject include *Grammar*; *Language*; and *Phonetics*. See also the entries on the various cases, moods, and tenses, e.g. *Nominative*; *Present*; *Verb*

The term philology (Gr. *philos*, lover of; *logos*, word, speech) has two or three different meanings.

(1) Originally, the study of the written word, of literature, especially that of Greece and Rome. This meaning still holds the field on the Continent, especially in Germany. (2) In English-speaking countries, however, the tendency is to understand by it the study of the words themselves, their origin, meaning, inflexions, and correct usage (syntax), which others re-

gard as accessory indeed, but subordinate. In this sense philology may be described as the science of language, as distinct from (3) comparative philology, which is the science of languages.

Comparative philology is the comparative study of the different sounds and words of languages included in a kindred group. The group specially studied in this connexion is that known as Indo-European, Indo-Germanic, or Aryan, and comparative philology

is usually taken to mean the study of the Indo-European family of languages, although it might equally well be applied to any other group, such as the Semitic languages. Its object is to collate and explain varieties in form, and to discover the principles which govern them. With this is also connected the comparative study of the syntax of the different languages.

Morphologically (according to the structure of the words) languages are divided into three classes. (1) Isolating, monosyllabic, or radical, distinguished by the absence of grammatical inflexions, the relations of words being shown by the position of the radical or a difference of tone in pronunciation. To this class belong Chinese, Burmese, and kindred dialects. (2) Agglutinative (glued together). In these, words are formed by the combination of a root-word with suffixes and prefixes, easily separable from the root-word, which remains intact and uncorrupted. To this class belong the languages of southern India, of the Turks and Hungarians. For example, in Turkish, from *sev-mek* (to love) are formed *sev-il-mek* (to be loved), *sev-me-mek* (not to love), *sev-e-me-mek* (not to be able to love), *sev-dir-mek* (to cause to love), etc. (3) Inflexional. In these the formative part of the word loses its individual character, and is used merely for expressing grammatical relation. Inflexional languages are further subdivided into synthetic, in which different elements unite to form a compound, and analytic, in which the compound is separated into its constituent elements. Greek and Latin are synthetic; English, Persian, and many of the languages of modern Europe, analytic. The place of the inflexions of a synthetic language is taken by pronouns, prepositions, and auxiliary verbs. Thus, in Latin, *ama-mus* (we love), the suffix *mus* expresses the first person plural; *amabo* (I shall love), the first person singular; the dative *magistro* requires three words in English (to the master). It is to the inflexional class of languages that the Indo-European family belongs. It is divided into nine groups.

Hindu Sacred Literature

(1) Indian, the most valuable member of which is Sanskrit. The Rig-Vedas, a collection of hymns from the sacred literature of the Hindus, are no doubt of greater antiquity than any other Indo-European literature. Bengali, Hindi, Gypsy, and Prakrit and

Pali, belong to this group. (2) Iranian (Persian), including Zend (Old Bactrian), the language of the Zend-Avesta, the sacred books of the fire-worshipping Zoroastrians, found also in the cuneiform inscriptions celebrating the exploits of the Persian kings Darius and Xerxes. The literature of modern Persia begins about A.D. 1000. (3) Armenian, supposed to be of Phrygian origin. (4) Greek, with its various dialects (Attic, Aeolic, Doric, Ionic), and modern Greek or Romaine. (5) Albanian. (6) Italic, including Latin, Oscan, Umbrian, and the cognate dialects of ancient Italy. Vulgar Latin was the origin of the Romance languages: French, Italian, Spanish, Portuguese, Rumanian, and Provençal. (7) Celtic, including Cymric, still spoken in Wales and Brittany (Breton, Armorican), and extinct in Cornwall; Gadhelic (Goidelic), of which the three forms are Irish, Manx in the Isle of Man, and Gaelic in the highlands of Scotland.

Germanic and Slavonic Groups

(8) Teutonic, to which group English belongs. It includes (a) Gothic, spoken in the Roman province of Dacia, preserved in fragments containing the greater part of a translation of the New Testament by Ulphilas (*q.v.*), the oldest record of a Teutonic language; (b) Western Germanic, subdivided into Old High German, the ancestor of modern German; Old Low German, represented in modern times by Low Saxon, spoken in a considerable area of northern Germany; Anglo-Frisian, from which modern Frisian, spoken in the north of Holland and in Slesvig, and English, are descended; Old or Low Franconian, the origin of Dutch and Flemish; (c) Eastern Germanic or Scandinavian, including Danish, Swedish, Norwegian, and Icelandic, the earliest remains of which are the Runic inscriptions. (9) Letto-Slavonic. (a) Lettic (Baltic), including the extinct Old Prussian, and Lithuanian; (b) Slavonic, comprising Czech (Bohemian), Polish, Russian, Serbo-Croatian, modern Bulgarian, and Slovenian. Of these Old Bulgarian or Ecclesiastical Slavonic, the language of the earliest Christian writings of the Slavs, is the most interesting.

Considering the wide area over which the Indo-European family of languages is spoken, divergencies in the vocabulary, grammar, and syntax of its different members would naturally be expected. But English, in spite of the numerous Latin words introduced into it

through the medium of French, is nevertheless shown by its inflexional remains, scanty though they are, to be undoubtedly a Teutonic language. Similarly, the identity, though obscured by the alterations due to phonetic laws and other influences, of groups of words in constant use in the ordinary relations of life—pronouns, numerals, and words, such as *father*, *mother*, *brother*, *sister*, and a general correspondence in the formation of words from roots and in their inflexional system, undoubtedly points to the existence of an older language, the parent of all the Indo-European languages. In fact, it is possible to a certain extent to reconstruct it. It does not, however, follow that all those who spoke the different Indo-European languages, which in the form in which we know them are dialectal varieties, were of the same race. This is sufficiently shown in the case of England, where, with some local exceptions, one language is spoken, although those who speak it are the descendants of a number of different peoples.

Indo-European Civilization

Neither the question of the original home of the Indo-Europeans, nor of the degree of civilization to which they had attained before they separated into different branches, has been satisfactorily answered. Older authorities placed them in Central Asia, but modern philologists favour a locality farther west—the borders of Europe and Asia, or even Europe itself, to the N. of the Carpathians.

The relationship of the different languages belonging to the Indo-European group is proved by the identity of some of the commonest words denoting action, existence, and similar notions. Take the present tense of the verb to be: Sanskrit, *asmi*, *asi*, *asti*, *smas*, *stha*, *santi*; Latin, *sum*, *es*, *est*, *sumus*, *estis*, *sunt*; French, *suis*, *es*, *est*, *sommes*, *êtes*, *sont*; brother in Sanskrit is *bhrātā*, Greek *phratēr*, Lat. *frater*, Celtic *brathair*, Russian *brat*, German *bruder*, English *brother*. The first three numerals are: Sanskrit, *ekas* (*eka-*), *dvas* (*dua-*), *trayas* (*tri-*); Gr. *heis*, *duo*, *treis*; Lat. *unus*, *duo*, *tres*; Celtic *un*, *dau*, *tri*; Russian *aden*, *dva*, *tri*; German *ein*, *zwei*, *drei*; English *one*, *two*, *three*. A number of words pointing to a certain degree of civilization were also common property. These show that the parent family was acquainted with the use of domestic animals such as the horse and cow, and tended sheep and herds; they lived in houses or huts with doors, not in caves; used rowing boats, made

garments of wool and sheepskin, prepared food at the fire, and knew something of the earliest metals. They reckoned by months, and counted up to a hundred. But they knew little of agriculture, and had no established political institutions.

The simplest form of a word is the root, that part of a word which remains after it has been stripped of everything formative and accidental. The next stage is the base or stem, in which the root is prepared to receive the inflexional suffixes. Thus, *da-*, *i-* are roots representing the general ideas of giving, going; *da-tar*, giver, with the addition of *-tar* denoting the agent, is a base. To indicate some special relation of one person or thing and another, an inflexional suffix is added: *da-tar-as*, of the giver. This form of a word is called a case (Lat. *casus*, falling, variation). The number of cases in the parent language was seven: nominative, accusative, genitive, dative, locative, ablative, instrumental. The vocative is merely a stem-form. In addition to two numbers, singular and plural, there was a dual, rarely used. The distinction of gender in nouns seems to have been artificial. In the verb, there were originally two voices, active and middle, the latter fulfilling the function of the passive. There were four tenses: present, future, perfect (imperfect), and aorist, the last three of which might be included in the general term past; and four moods, indicative, imperative, subjunctive, and optative. These inflexional variations can be best studied in highly inflexional languages, such as Greek and Latin, whereas in analytical languages, such as English, they have left hardly any traces.

Causes of Change in Language

A comparison of the older with the more recent forms of the languages belonging to the Indo-European family, for instance, modern English with that of Alfred's day, shows that great alterations have taken place in the form and meaning of words, and such changes are still going on. The comparative philologist examines these changes and, where possible, accounts for them. (1) Perhaps the most far-reaching influence is simple laziness, the unconscious desire to make the utterance of any particular sound or combination of sounds as easy as possible. And this desire operates in different ways among different peoples, some of whom find it difficult—in some cases even impossible—to utter a sound which is perfectly easy to others.

(2) Another cause is Analogy, unconscious or imperfect imitation. This is seen in such forms as *burst*, *runned*, *feels*, *done* (I done it), *badder*. It also leads to the formation of new verbs from nouns, such as *to motor*, *to telegraph*, with past forms *motored*, *telegraphed*. Similarly, a foreign or unfamiliar word is altered to something which seems, although wrongly, to convey a meaning to the speaker, China asters becoming Chinese oysters, Bellerophon Billy Ruffian. The tendency is to introduce new forms based on a real or fancied analogy of the old. Other causes at work are Assimilation, Dissimilation, and Indistinct Articulation. Most of these are connected with the mechanism of speech, which belongs to the subject of Phonetics, and are therefore classed under the head of phonetic change.

Comparative Philology

Comparative philology was first rendered possible by Sir William Jones (1746-94), who introduced ancient Sanskrit to European scholars. He correctly established the relationship of Greek and Latin as sister languages, whereas they had previously been regarded as mother and daughter. F. A. Pott (1802-87) was the first to investigate scientifically the whole Indo-European group of languages from the standpoint of etymology. The names of A. Schleicher (1821-68), G. Curtius (1820-85), and W. Corssen (1820-75), were the most distinguished representatives of what is called, somewhat arbitrarily, the Old School of Philologists.

Schleicher's investigations were directed towards the formulation of laws to which the sounds of those languages were subject, and by which the changes in them were governed. Curtius devoted his attention mainly to Greek, while Corssen confined himself to Latin and the old Italian dialects. F. Max Müller (1823-1900) popularised the results of philological study for the ordinary student. Some of his theories did not meet with general acceptance, and his views on the nature of language and its changes are quite at variance with those of W. D. Whitney (1827-94), whose work on the Life and Growth of Language gave a new impulse to the study.

The New school of philology, represented by Brugmann, Osthoff, Paul, and Delbrück, in reality only differed from the Old in the extent to which it carried out already acknowledged principles. Valuable discoveries were made by Brugmann and Grassmann in regard to the primitive vowel system and the aspirates, while Verner

proved that many apparent exceptions to Grimm's law were the result of the accentuation of the vowel in the Indo-European word. Briefly the principles of the New school are that, while the Old school admitted sporadic (isolated) changes, Phonetic Laws are on the contrary absolutely fixed and subject to no exceptions.

A younger branch of philology, as yet in its infancy, dealing with the development of the meanings of words, has received the name Semasiology or Semantics (*q.v.*).

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Philomela (Gr., lover of song). In Greek mythology, daughter of Pandion, king of Athens. Dishonoured by Tereus, a Thracian prince who had married her sister Procnē, Philomela, together with her sister, took revenge by serving up to Tereus the flesh of his own son Itys. Procnē and Philomela, pursued by Tereus with an axe, in response to their prayers were transformed into a nightingale and a swallow, while Tereus became a hoopoe. According to another version, Philomela becomes the nightingale, and in poetry her name in English, Philomel, is a synonym for that bird. *Prom. Fillo-meela*.

Philopoemen (c. 252-183 B.C.). Greek general and patriot, known as "the last of the Greeks." Born at Megalopolis, he devoted himself as a young man to military studies, and fought with distinction at the battle of Sellasia, 222. In 208 he was elected general of the Achaean League (*q.v.*), and brought its members to a high standard of military efficiency. His technical military reforms bore excellent fruit the same year, in the form of a defeat of the Spartans, near Mantinea. Recognizing the power of the Romans, he avoided conflicts with them, and used his influence to mitigate the severity of their measures. He took Sparta in 188, and abolished the institutions of Lycurgus. During a Messenian revolt he was captured and compelled to take poison.

Philosopher's Stone. One of the chief objects of search in alchemy (*q.v.*). It was a supposed substance that had the power of turning base metals into gold.

PHILOSOPHY : THE SEARCH FOR WISDOM

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This work contains articles on the various systems of philosophy, e.g. Epicureanism; Pragmatism; Scepticism; Stoicism. See biographies of the great philosophers, e.g. Aristotle; Descartes; Green; Hegel; Kant; Plato; Socrates; also Ethics; Metaphysics

Philosophy is a Greek word, invented by Socrates in the 5th century B.C. to express the distinctive attitude which he took up to knowledge. His scientific contemporaries and predecessors had called themselves Sophoi—wise men; he called himself a philosopher—one fond of or seeking wisdom—to show that, while he believed in wisdom or science, he did not think he or anyone else had attained it. The philosopher is someone who is seeking wisdom, and has begun by a consciousness of his own ignorance—and philosophy is the name for the inquiries he makes, or for his thinking.

In the original meaning of the word, then, there was little distinction between philosophy and science, except that the suggestion of seeking conveyed by the word philosophy made men give the name science to those inquiries where knowledge was attained and certain, philosophy to those where the search for knowledge was more obvious than its results. In this sense of the word philosophy, the sphere of philosophy contracts as that of science widens. This is to some extent borne out by history. We find the Greeks, or even a man like Descartes in the 17th century, including under philosophy what we should now certainly call science. This suggests that in time, as the methods of science are applied to every sphere of human inquiry, there will be no sphere left for philosophy.

Meaning of Philosophy

But the real implications of Socrates' new word were rather different. When he said that he was ignorant, he did not mean that he was ignorant of certain things which the mathematician knew, but that the mathematician did not know as much as he thought he knew; that the so-called knowledge of his contemporaries was not really knowledge. Philosophy, therefore, with him and his successors, involved a criticism of existing knowledge, an attempt to say what it all comes to. In a famous passage in the Republic, Plato contrasts the methods of the scientist and of the philosopher by saying that the scientist starts with certain assumptions which he takes for granted and does not examine, while the business of the philosopher is to criticise the assumptions of the separate sciences

and from such criticism to come to an understanding of the whole.

This suggests two characteristics of philosophy. In the first place its method is reflective. It takes as its data not the data of the sciences, but the sciences themselves. In the second place it is concerned with things as a whole, while the sciences are departmental.

Science, Religion, and Morality

The impulse to philosophy arises from the apparent contradictions of different spheres of human inquiry. Thus in Greece in the 5th century B.C. the growth of science seemed to threaten the moral basis of the Greek city state—science and morality seemed in conflict—and the great Greek philosophers were men who cared for both science and morality. Their task was to show that if the real nature of each was understood, and what each implied, the contradiction vanished. It came only from one or the other inquiry overstepping its proper bounds. So again in the 17th century the new applied mathematical sciences, with their assumptions of a world infinite in time and space, rigorously determined and mechanical, seemed to destroy the foundations both of religion and of the moral life. The work of the philosophic movement of the 17th and 18th centuries, which began with Descartes and culminated in Kant, was to resolve this apparent contradiction. It did so by seeking first to determine the real nature of science and of religion and morality, and by so doing to determine their bounds.

The general lines of the solution are always the same. Contradictions arise only because men engaged in these different inquiries have not properly understood what they have been doing. They have not made clear to themselves the principles on which their inquiries are based, and so have gone outside their proper task. Religion has talked science, talked it on religious lines and therefore badly, and given its bad science an authority it did not deserve. Science has talked religion, on scientific methods and therefore badly, and given to its bad religion an authority it did not deserve. We can only understand what we are doing in these different spheres of life by reflecting on the principles or assumptions on which our different activities are

based. This is the task of philosophy. Thus the business of moral philosophy is not to say what is right or wrong—that is done in moral judgements—but to understand what morality is; as the business of the philosophy of art is not to say what is beautiful or ugly, but to understand what we are doing when we call things beautiful or ugly, and what the relation of that activity is to morality or to science. Philosophy, therefore, is always concerned with the principles or assumptions which lie behind different branches of human activity. It is not concerned with the details of those activities, except in so far as they illustrate the principles. It is not the business of philosophy, for example, to examine or to do over again the work of the physicist, but when the progress of physics makes it necessary to revise the assumption on which physics has so far been based, as has happened recently in the discoveries of Einstein, then philosophy is concerned. For criticism of assumptions is its business.

This concern with first principles is what gives philosophy what is called its *a priori* character. This does not mean, as is sometimes supposed, that philosophy has no relation to facts, and is spun out of the philosopher's inner consciousness. All great philosophies have started with the consideration of special problems presented by the sciences of their day, and have been built on knowledge of and reflection upon those sciences. It has, however, sometimes been thought that it is possible by a study of the first principles implied in science and other human activities to build up a knowledge of the real nature of the universe, which goes beyond and may have very little to do with our actual knowledge of different facts.

Idealism and Materialism

Idealism, as sometimes understood, and materialism, are philosophies which profess to show, by rigorous reasoning, that the only reality is mind or matter. It was the great achievement of Kant to show in his Critique of Pure Reason, 1781, that in such a dogmatism, as he called it, philosophy was overstepping the limits of its function, and using conceptions, which were only applicable to what we experience, outside the bounds of experience. Philosophy, he held, should be confined to criticism, to the understanding of the relation of the sciences and other forms of human activity to one another. Nevertheless, just because philosophy is reflective in the sense

described above, it is always concerned to see things as a whole, to overcome the departmentalism of the different branches of human activity, and to attempt to say what they all come to.

Its assumption in this task is that the world we live in is an intelligible one, and by means of that assumption it rules out many ill-patched-together views of the universe which will not bear thinking out. It can and does also sketch what would be an intelligible universe; what must be the relation of the various things we know, and all that is beyond our knowledge if the whole is to be thought of as intelligible. This is the constructive side of philosophy. No one can read a great constructive philosopher like Plato or Spinoza or Hegel without feeling that he has, somehow, in the process come to understand more of the meaning of life and of the nature of the world we live in.

It is a mistake, however, to suppose that such constructive philosophy, such a world vision, as the Germans call it, has either the precision of the exact sciences or the rigour of logical criticism. The great philosophies bear upon them the stamp of the personality of their authors. They seem to stand between science and poetry. Their illumination and truth are of the order of poetic rather than of scientific truth. It has a value all its own, because of its comprehensiveness, because it is the wisdom of a mind which has tried to think through and comprehend the great mass of human knowledge. Such philosophies, therefore, can never be final. For, as the sum of human knowledge increases, as science lays open new fields to man's understanding, the comprehensive and synthesising work of philosophy has to be done afresh.

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Philostratus (c. A.D. 170-250). Greek sophist. Born in Lemnos, he studied and taught at Athens, and later took up his abode in Rome. At the instigation of his patroness, Julia Donna, wife of the emperor Septimius Severus, he wrote a romantic Life of Apollonius of

Tyana, Lives of the Sophists, and a treatise on Gymnastics. Another Philostratus wrote on Paintings,

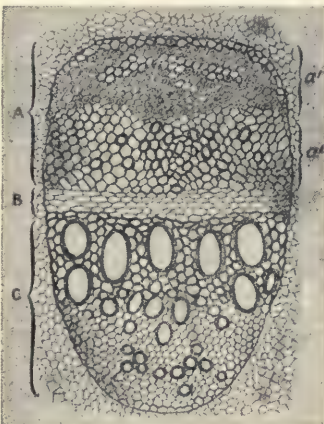
Philtre (Gr. *philtron*, from *philein*, to love). Magical potion supposed to have the power of exciting the affection of the person to whom it was administered.

Phiz (abbreviation of *physiognomy*). Pseudonym taken by the comic draughtsman and Dickens illustrator, Hablot K. Browne (q.v.).

Phlebitis (Gr. *phleps*, vein). Scientific name for the inflammation of a vein (q.v.).

Phlegethon (Gr., flaming). In Greek mythology, a river of fire in the lower world.

Phloëm (Gr. *phloios*, inner bark). Botanical term, denoting the bast or soft cellular tissue on the exterior of the fibro-vascular bundles found in stems, leaves, and roots of plants. Its cells are the channel through which the sugar and amides elaborated in the leaves are transmitted to those parts of



Phloëm. Diagram of transverse section of fibro-vascular bundle from an herbaceous plant. A. Liber or phloëm, consisting of hard bast, a', and soft bast, a''. B. Cambium layer or tissue of delicate growing cells. C. Wood or xylem

the plant where they are required for building up and for reserves. See Plant.

Phlogiston (Gr. *phlogistos*, burnt). Term formerly used in chemistry for a supposed substance contained in all materials which could be burnt. The phlogiston theory was widely held by leading chemists in the 18th century, it being believed that, the more phlogiston present in a substance, the more violently it burnt. The theory was exploded by the researches of Lavoisier.

Phlogopite (Gr. *phlox*, flame; *ops*, face). In mineralogy, a magnesium mica. It is a light yellow to brown and red, and when looked at through a thin sheet it shows star-

shaped reflections. A constituent of serpentine rocks, phlogopite is found in Europe and N. America.

Phlomis. Large genus of shrubs and herbs of the natural order Labiatae. They are natives of the temperate and mountainous parts of Asia and the borders of the Mediterranean. They have yellow, purplish, or white flowers in whorls around the upper parts of the stems. The wrinkled leaves are in many cases cottony or woolly beneath. Some of the species are very showy.

Phlox (Gr., flame). Genus of about 50 species of herbs, mostly perennials, of the natural order



Phlox. Foliage and flower clusters

Polemoniaceae, natives of N. America (chiefly) and Siberia. They have undivided leaves, and showy salver-shaped flowers of some tint of red, violet, or white, borne singly or in panicles. Many of them have become favourite garden flowers in Britain, to which the smooth-leaved *P. glaberrima* was introduced from the southern United States in 1725. This species, with *P. paniculata* and *P. maculata*, introduced a few years later, were the original parents from which most of our garden hybrids have descended. These are perennials, propagated by cuttings and root-divisions; the natural species may also be increased by seed sown as soon as ripe. There are several dwarf perennials, such as the tufted moss-pink (*P. subulata*) and the creeping *P. reptans*; whilst the favourite half-hardy annual is *P. Drummondii*. Phloxes do well in any well-drained garden soil; the tall-growing forms need one that is heavy and deep, and in hot weather require ample water.

Phocaea. Ancient Greek city of Asia Minor. Situated on a promontory N. of the Gulf of Smyrna, it became a great maritime and colonising power; the Greek colony of Massilia (Marseilles) was an offshoot from Phocaea. When, with the other Greek cities of Asia Minor, Phocaea passed under the dominion of Persia, about the

middle of the 6th century B.C., the majority of the inhabitants emigrated to Corsica and elsewhere.

Phocion (402-317 B.C.). Athenian general and statesman. A competent soldier, he distinguished



Phocion,
Athenian general

From a statue in the
Vatican, Rome

himself at the battle of Naxos in 376. at Tamynae in 354, and by raising the siege of Byzantium in 339. A sincere patriot, noted for his single-minded integrity, he nevertheless belonged to the pro-Macedonian party at Athens, believing that resistance to Philip and later to Alexander and Antipater was useless, and that he was doing a real service to his country by im-

pressing this idea on the Athenians. In 318 Phocion was accused of assisting the son of Polyperchon to occupy the Piraeus, and was condemned to death the next year.

Phocis. Country of ancient Greece. It lay N. of the Corinthian Gulf and W. of Boeotia. It contained the famous Mt. Parnassus (*q.v.*), sacred to Apollo and the Muses, and the equally famous Delphic Oracle (*see* Delphi). The population was chiefly Aeolic, mostly occupied in pastoral pursuits. There were no large towns. The Phocians were not conspicuous in Greek history until the 4th century B.C., when, owing to their failure to assist them at the battle of Mantinea in 362, the Thebans instigated the Amphictyonic Council (*q.v.*) to declare their land forfeited to the Delphian Apollo. The Phocians, led by an able citizen, Philomelus, retorted by seizing the treasure at Delphi and, using it to hire mercenaries, defied Thebes and the Amphictyons for ten years, and only yielded in 346 when Philip of Macedon came to the help of the Amphictyons. The war is known as the Sacred War. *See* Greece.

Phoebē (Gr., bright). In Greek mythology, name given to Artemis as moon goddess, the female counterpart of Phoebus. *See* Artemis.

Phoebus. In Greek mythology, name given to Apollo as sun god. *See* Apollo.

PHOENICIA: ITS CULTURE & COMMERCE

A. D. Innes, M.A., and E. G. Harmer

Related articles that may be consulted are those on Carthage; Jews; Mediterranean; Palestine; Syria; Tyre; Sidon. See also Alphabet

Phoenicia was the small territory on the E. coast of the Mediterranean lying immediately N. of Palestine, between the range of Mount Lebanon and the sea. Its length from Akko (the modern Acre) northwards does not exceed two hundred miles; its breadth averages perhaps fifteen miles. As a military power Phoenicia played no important part in the world's history; but she planted colonies, one of which, Carthage, achieved for a time an imperial position; the skill of the Phoenician seamen gave their fleets a high value in maritime warfare; and their supremacy in regard to seaborne commerce was maintained, in spite of the development of Greek rivalry, until Phoenicia lost her separate existence at the end of the fourth century, and her offspring Carthage was crushed by Rome a hundred years later.

Language and Religion

It is generally agreed that the Phoenicians belonged to the great race group known as the Semites. Their language at least was Semitic, closely related to Hebrew. Their religion was based upon the worship of the male and female principles, commonly associated with the names Baal and Ashtaroth, or Astartē; though in course of time the two were multiplied by a process resembling that by which in medieval times popular superstition tended to make many saints out of one who had several famous shrines. Of Baal and the Baalim we hear much in the Hebrew records; and we know that the worship of Melek, the Moloch of the O.T., was accompanied by human sacrifice, and more particularly by the burning of infant victims; while the worship of Ashtaroth carried with it the repulsive practice of religious prostitution.

The destinies of Phoenicia were determined by her geographical position. The Semitic wave which bears the general name of Canaanite occupied Palestine and the regions to the N. of it a century or two before 2000 B.C. Between 1600 and 1200 the S. portion was conquered by fresh Semitic tribes from the S., the Hebrews, and by the Philistines, maritime invaders from across the sea. But the N. Canaanites, the Phoenicians, were able to hold their own against both the invaders, since they were open to attack only by sea or by the two narrow entries in the N. and on the S.—the mountains of Lebanon

providing them with an effective barrier along the whole rear. This security upon the landward side encouraged maritime development; so that the Phoenicians were already able to resist the attack of the Philistine pirates, and learnt the advantage of devoting themselves to commerce in the centuries when other nations and other races were still engaged in a perpetual struggle to win a foothold in new territories, or to hold these territories against invaders.

The fame of the Phoenicians is due to their supremacy as navigators over all rivals. In the 5th century the pre-eminence for a thousand years which they had inherited was still undisputed. They alone of seafaring men had passed out of the Mediterranean, coasted along Spain and France, established a trade with the "Tin Islands"—the Scilly Isles and Cornwall—and penetrated possibly as far as the Baltic, from which they procured amber. Moreover, Phoenician ships in the Egyptian service actually accomplished the circumnavigation of Africa about the year 610 B.C., though the voyage was not repeated. They are the single people in the ancient world who lived for commerce; they sought no territorial dominion; if they planted out colonies, the primary intention at least was merely the establishment of trading stations like those of the English in India during the 17th century; Carthage alone, long after its foundation, sought to develop upon imperial lines, and to establish a political ascendancy where she secured a commercial footing. First of men, the Phoenicians learnt that sea-fighting is primarily a matter of seamanship, and, being skilled seamen, could defy attacks by sea.

Commercial Importance

Like the maritime Italian cities of the Middle Ages, the Phoenician ports became the commercial emporiums of the ancient world, and they waxed wealthy; but the Phoenicians are not to be credited with any remarkable manufacturing inventions. It was the exploitation of ancient purple dyes, not their discovery, for which they became famous. In the making of glass, wherein they excelled, they only turned to better account processes already invented by the Egyptians, and their reputation as clothmakers was attained by improved methods rather than by original discoveries. Phoenicia

made no original contribution to art; but it was in strict accord with the Phoenician genius that it should have made the great advance upon early systems of script or writing which rendered the Phoenician alphabet the basis of those which ultimately prevailed in the Western world.

Phoenicia never formed a united nation with a common government. It was a group of city states, of which the most important were Arvad (Aradus), on the N., Gebal (called by the Greeks Byblos and by the Egyptians Kapun), Beirut, Sidon, and Tyre on the S. Early in the 15th century B.C. the conqueror Thothmes III brought them under the Egyptian supremacy (see Egypt), and they became tributaries, though otherwise remaining autonomous. At this time Byblos apparently held the leading position. By the 13th century the yoke of Egypt slipped off, and Phoenicia was again independent, the leadership having passed to Sidon, which thenceforth disputes the premier position with Tyre. Politically, in fact, Tyre seems soon to have predominated, the result, perhaps, of its extraordinary strength as a fortress; but Sidon probably enjoyed a prestige of its own as the religious centre. In the Homeric poems, not Tyrian but Sidonian stands as the general equivalent for Phoenician. During the 13th and 12th centuries Tyre and Sidon were planting out colonies along the coast of Africa at Utica and elsewhere, and even beyond the Straits of Gibraltar in Spain, at Gades and Tartessus, which is usually identified with the Tarshish of the Bible.

Relations with the Hebrews

In the 11th century the Hebrew records show that Tyre had definitely become the leading Phoenician state. Hiram, king of Tyre, was the ally of David and Solomon during the brief period of Hebrew consolidation and expansion, which broke down with the disruption that followed the death of Solomon. The relations between Phoenicia and the Hebrew kingdoms were maintained, and Ahab, king of Israel, married Jezebel, daughter of Ethbaal or Ithobal, king of Tyre and Sidon, in the earlier half of the 9th century. It was about this time, however, that the power of Assyria was extending, and Phoenicia before 840 had become tributary to Shalmaneser III.

After 730 Tyre revolted, and successfully defied the power of Shalmaneser V. Phoenicia was again subjugated by Sennacherib, about 700, and though she again achieved a brief freedom when

Assyria was shattered towards the end of the 7th century by the rise of the new Babylonian empire, she soon found herself forced to submit to Nebuchadrezzar, though Tyre, on its island fortress, held out against his attack for 13 years: Phoenicia yielded a ready submission to Cambyases in 527.

Then for two hundred years Phoenicia formed an autonomous province within one of the great satrapies of the Persian empire, providing the Persian kings with the most efficient contingents of their fleets. In 351, however, Phoenicia revolted. Overwhelming armies were poured into the province; resistance was hopeless; but the people of Sidon rather than submit chose to make a literal holocaust of the city, when 40,000 of the inhabitants are said to have perished in the flames (345). Eleven years later, when Alexander the Great invaded Persia, his movements were greatly hampered by the fact that his enemy had command of the sea, because the Phoenician fleet still served the Great King, though its loyalty cannot have been deeply rooted. But after Alexander had put Darius to rout at the Issus (333), the cities of Phoenicia, with the exception of Tyre, broke from the Persian allegiance and submitted to the Macedonian.

Siege of Tyre

Then ensued one of the most memorable sieges in classical history. Tyre, on its island, had defied Nebuchadrezzar for 13 years; now it defied Alexander. It was only by means of engineering operations without precedent or parallel that the great master of war was at last enabled to storm the fortress after an heroic defence; nor would that success have been within his reach but for the accession of the Phoenician fleet, with the exception of the Tyrian navy itself. With the fall of Tyre in July, 332, the separate history of Phoenicia comes to an end. The history of Greater Phoenicia, the independent Phoenician colonies, was to all intents and purposes the history of Carthage.

A. D. INNES
ARCHAEOLOGY. Material remains of the Phoenician civilization have been sparingly recovered in the homeland. Marked by an imitative rather than a creative spirit, the earlier examples form an imperfect amalgam of Egyptian and Mesopotamian motives, the later an unskilful adaptation of Hellenistic art.

Along the coast are many rock-cut tombs, sometimes with remains of monolithic and other external structures. Some have

yielded sarcophagi shaped like swathed mummies. The finest, that of Eshmunazar, in Paris, and that of his father Tabnith, in Constantinople, were both Egyptian importations; the local work is inferior. The primitive temple at Amrith, the only one extant in Phoenicia, copied the Egyptian style. The preference for megalithic masses is shown by the Arvad city walls and the Thapsus harbour works. In 1920 the fortifications surrounding the Sicilian island of Motya were reported to have been traced.

No specimens of Phoenician weaving or dyeing have been identified. The importance of the purple industry is attested by immense shell-mounds near Sidon and Tyre; how far their textile trade was served by native looms is unknown. Glasswork is represented by small ointment flasks tinted with metallic oxides, and by opaque glazes—copied from Egyptian faience—which were used for imitation jewelry, amulets, and the like, produced for export. Terracotta figurines of indifferent quality were turned out for the same trade.

Skill in Metal Work

Excellent work was done in engraving and hammering sheet metal. Cups and platters, or paterae, in silver and silver-gilt, with mythical scenes and illustrations of daily life, sometimes bear Phoenician inscriptions, but the best were Cypriote. One such Cyprus bowl, with the name of Hiram, king of Tyre, exhibits the oldest example of Phoenician writing. Bronze paterae unearthed at Nimrud, associated with ivory carvings, sometimes reveal the names of Phoenician artisans, presumably attached to the Assyrian court. Unimaginative mixtures of styles characterise much Phoenician work, as in the form of the sphinx, which was usually recumbent, as in Egypt, but winged, as in Assyria.

Of the many thousands of inscriptions collected, few are of historical value. The earliest has been mentioned; another, from Sinjerli, preceded the fall of Nineveh. All others, including the famous Yehawmelek stela from Byblos, are subsequent to the Persian conquest. Phoenician seacraft is illustrated on Assyrian wall-reliefs and in Egyptian tomb-paintings. Nothing remains to mark the more distant adventures, except perhaps some Sumatra inscriptions attributed to them, and dated to 450 B.C. See History of Phoenicia, G. Rawlinson, 1889; Ancient History of the Near East, H. R. Hall, 5th ed. 1920.

E. G. HARMER



1. Restoration of tomb at Amrith, shown also in 2 in its ruined state. 3. Carved ivory comb. 4. Bowl in repoussé work, from Praeneste. 5 and 6. Sarcophagi from Sidon. 7. Bronze mirror handle. 8. Pottery vase with typical Phoenician ornament, from Dali, Cyprus. 9. Examples of glass-work. 10. Bead necklaces

PHOENICIA: ARTISTIC HANDIWORK OF THE ANCIENT SEMITIC KINGDOM

With the exception of 3, by courtesy of Chapman & Hall, Ltd.

Phoenix. In Greek legend, king of the Dolopæa. He became tutor of Achilles and accompanied him to the Trojan War. Phoenix was one of the heroes who took part in the hunt for the Calydonian boar.

Phoenix. In astronomy, one of the southern constellations. Named by Bayer, 1603, it possesses a number of well-known double stars, Alpha Phoenixis having a period of 190 days. It has been shown by Sir David Gill to be moving away from the sun at over 50 m. a second.

Phoenix. Mythical bird of the Egyptians, sacred to the sun god. In the best-known version of the fable, the bird was supposed to appear at Heliopolis once in every 500 years and build a pyre, on which it was burnt, a new phoenix rising from the ashes.

Phoenix. City of Arizona, U.S.A., the capital of the state and the co. seat of Maricopa co. It is 145 m. N.W. of Tucson. Fruit, grain, livestock, and olives are traded in. Pop. 29,100.

Phoenix. Group of eight small islands in the Pacific Ocean, belonging to Great Britain. They are situated about 1,200 m. N.E. of Fiji. Area 16 sq. m.

Phoenix. British assurance company. It was founded in 1782, being one of the oldest associations



of the kind. Its funds are nearly £20,000,000, and the head offices at

Phoenix House, King William Street, London, E.C.

Phoenix Park. Public park on the W. confines of the city of Dublin, Ireland. The name is derived from the Irish *fiann uisce*, clear water. It comprises 1,752 acres, with a circuit of 7 m. Within the grounds are Viceregal Lodge and the former residence of the chief secretary, the zoological gardens, the people's garden, and an obelisk (205 ft. high) in memory of the duke of Wellington. See Dublin.



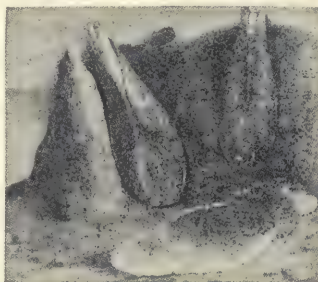
Phoenix Park, Dublin. The Avenue which runs for two miles across the park

Phoenix Park Murders. Name given to the murders of Lord Frederick Cavendish and T. H. Burke in Phoenix Park, Dublin, May 6, 1882. On that day Earl Spencer,

the new lord-lieutenant, entered Dublin in state, and in the evening Lord Frederick, the chief secretary, and Burke, the under-secretary, set out across Phoenix Park for the former's residence. It was still daylight, but on the way they were attacked by nine men and killed. In 1883 a builder named James Carey turned informer, and largely on his evidence 20 men were found guilty and five hanged for the murders. Carey was sent for safety to S. Africa, but, although great secrecy was observed, he was murdered at sea, July 29, 1883.

Phoenixville. Borough of Pennsylvania, U.S.A., in Chester co. It stands on French Creek, at its union with the Schuylkill river, 28 m. N.W. of Philadelphia, and is served by the Philadelphia and Reading and the Pennsylvania Rlys. Manufactures include iron and steel products, boilers, hosiery, silk, and matches. It was settled in 1732 and incorporated in 1849. Pop. 10,500.

Pholas. Genus of marine bivalve molluscs. They burrow in soft rocks, wood, and firm mud



Pholas. Section of soft rock showing examples of *Pholas dactylus* in their burrows

around the shore, about four species occurring in Great Britain. They have white shells, and the common species, *P. dactylus*, is locally known as the piddock, and used both for bait and food.

Phonetics (Gr. *phonētikos*, connected with the voice). Study of

part of a pair of bellows. This current passes through the larynx (*q.v.*), where it may be modified by the vibrations of the vocal cords.

The sound thus produced, called voice, is further individualised in the oral and nasal cavities by the action of the tongue or teeth, or the position of the different parts of the mouth. These cavities act as a kind of sounding board, contact with which increases the volume and resonance, or timbre, of the sound produced. In recent times considerable attention has been directed to a more scientific classification of the speech sounds, based on physiological principles. The old division was that into vowels and consonants, the latter being subdivided into mutes, liquids, nasals, and spirants. Under mutes were included *tenuæ* (k, t, p), *mediae* (g, d, b), aspirates (kh, th, ph); liquids were l and r; nasals were m and n; and spirants were f, h, j, s, and v.

Modern classification recognizes the following principles. Consonants are arranged in pairs: voiced or sonants, and voiceless or surds. In voiced sounds the vocal cords are put into rhythmic vibrations by being tightened, and a musical clang is produced; but when the breath streams through the wide-open glottis, and no articulation takes place in the larynx, voiceless sounds arise. Thus g, b, d, w, v, and the English nasals are voiced; k, p, t, wh, f, voiceless.

Consonants are further classified according to the amount of restriction to which the air is subjected in the mouth and nose cavities. (1) Fricatives or spirants are produced by the mouth-canal being narrowed in part and the air rubbing against the narrowed part (ch, f, j, w, s). (2) Explosives arise through the sudden closing and re-opening of any part of the mouth-passage, which, as it were, causes the air to burst forth. These sounds are also called *momentary* in contrast to *continuous* sounds, the articulation of which can be prolonged. (3) Side-consonants are produced by the tongue closing the middle of the air-passage, and letting the air escape at the sides, as in l. (4) Nasals are formed by turning the air current into the nose instead of the mouth. As a rule, the nasal cavity is shut off by the soft palate and pure mouth-sounds are produced (a, t, f). But if the soft palate is allowed to hang down freely, so that the sound can pass through the nasal cavity, the result is the pure nasals (m, n).

Consonants are also classified according to the place of articulation. (1) *Labials* or lip-sounds: here the

the articulate sounds of a language, the manner of their production, their nature and mutual relations. A current of air is sent out from the lungs, which play the

breath is checked by the action of the lips or lower lip and upper teeth (b, f, p). (2) *Sibilants* or blade-consonants: here the surface of the tongue behind the point is brought close to the hard palate, as in s, sh. (3) *Interdentals*: here the rim of the tongue stops the slit between the two rows of teeth, as in English th. (4) *Dentals*: here the stop is caused by the front part of the tongue acting upon the inner wall of the upper teeth or their sockets (d, t). (5) *Palatals*: here the middle of the back part of the tongue acts against the back part of the hard palate, e.g. the softened k in English kit. (6) *Gutturals*, also called throat-sounds or velars: here the hinder part of the back of the tongue articulates against the soft palate, e.g. the English o in cat.

The following classification of consonants, although by no means complete, indicates the character of the English consonants and the best known of those in foreign languages. Digraphs, or combinations of two letters to express a single sound, are used in some cases. Thus kh expresses the guttural fricative sound produced by placing the tongue to the roof of the mouth, as in k, except that a narrow space is left, through which the air is forced. In the following list the pairs of voiceless and voiced consonants are indicated by colons, e.g. p : b.

Labials. (1) Both lips. Fricatives, Gr. ph : Gr. b. Voiced nasal, m. (2) Lower lip and teeth. Fricatives, f : v. (3) Lips and back of tongue. Fricatives, wh : w.

Sibilants. (1) Blade of tongue. Fricatives, s : z. (2) Blade and point. Fricatives, sh : zh (*measure*).

Interdentals. Fricatives, th : dh (*then*). Voiceless stop, French t.

Dentals. Fricatives, Icelandic hr : r. Side, Welsh ll : l. Stops, t : d. Nasals, Icel. hn : n.

Palatals. Fricatives, Ger. ch (*ich*) : y. Voiced side, ly (Fr. *famille*, Ital. *egli*). Stops, Hung. ty : dy (Hung. gy). Voiced nasal, ñ (Fr. *vigne*, Sp. *señor*, Ital. *ogni*).

Gutturals. Fricatives, kh (Ger. *ach*) : gh (Ger. *sagen*). Voiced side, Russian guttural l. Stops, k : g. Voiced nasal, ng (*sing*).

H, not included here, is a fricative, produced, like several peculiar Arabic sounds, in the throat.

Vowels are voiced sounds, modified by the tongue, lips, and soft palate, but without any audible friction.

The vowels, the number of which is indefinite, are modified in four principal ways. (1) They are unrounded if the lips are fully open, as in *fit*; rounded if the lips are partly closed, as in *ü* (Fr. *u*). (2)

Front vowels are produced by stretching the tongue forward, as in *pin*, *ten*; back vowels by drawing it back, as in *sun*, *saw*, *barn*. There are also mixed vowels, intermediate between front and back, as in *bird*. (3) High or close vowels are produced by raising the tongue, as in *fit*, *pull*; mid and low vowels, classed together as open, by lowering the tongue, as *barn*, *may*, *bird*, *pack*, *saw*. (4) Nasal vowels, characteristic of French, Portuguese, and Polish, but not occurring in English, are formed by opening the nose-passage, as in Fr. *plan*, *en*, *vin*, *on*, *un*. There are other vowels identical with continuant consonants, such as m, n, l, when they form syllables in themselves, as in *fasten*, *cattle*. See Consonant; Pronunciation; Vowel.

Bibliography. Elementary Phonetics of English, French and German, W. Victor, Eng. trans. W. Rippmann, 1899; A Primer of Phonetics, H. Sweet, 3rd ed. 1906; Introduction to English, French and German Phonetics, L. Soames, 3rd ed. 1913; The Sounds of Spoken English, W. Rippmann, new ed. 1914.

Phono-Cinema. Talking film, an invention by which the photographic record of action and the gramophone record of speech are synchronised. Scientists in different countries had been working for years on the problem of the relation of light and sound, and on the photography of sound. As soon as the recording of sound through light was accomplished the question of synchronising the photography of objects and of sound, so as to reproduce simultaneously action and sound, was only a matter of time.

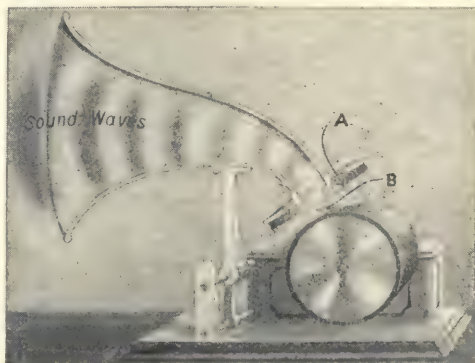
The first talking film made was described by The Times on Sept. 24, 1921. The earliest completion of the invention is due to Sven Aison Bergland, of Stockholm, but almost simultaneously with the announcement of his achievement, a British inventor, H. Grindell-Matthews, produced an apparatus based on rather different principles, but achieving the same result, the automatic synchronisation and reproduction of action and sound.

The Swedish machine is a double camera with two reels. On the one the ordinary photographic repro-

duction of the passing scene is taken; on the other the sound is recorded, not as in a gramophone record by scratchings on a cylinder, but photographed light. The second camera is directed at a ray of light agitated by the actor's voice. Across the end of a receiver a diaphragm of rock crystal is stretched. This diaphragm vibrates with the voice, and writes on the celluloid film as it moves through the camera curves, corresponding to the vibrations which agitate it. The pictured vibrations are changed into resonant vibrations by the use of selenium, the most sensitive of all known metals. Mr. Matthews uses a tiny mirror of stainless steel which vibrates two pencils of light, which are focused on the edge of the film. This is a process less complex than the Swedish one, both the scene and the sound being recorded on a single film. See Cinematography; consult also the article, A Swedish Invention, in The Times of Sept. 24, 1921.

Phonograph (Gr. *phōnē*, sound; *graphein*, to write). Talking machine which records and reproduces sounds. As invented in 1876, it consisted of an axially-moving rotating brass cylinder, mounted on a screw, and covered with tin foil, against which pressed a needle secured to a thin diaphragm. The needle ran in the middle of a helical groove cut on the cylinders, and, when the diaphragm was not vibrating, the needle forced the tin foil into the groove, whereas, when the diaphragm was vibrated by sound waves entering a trumpet or horn, the movements of the needle made indentations in the tin foil in the groove.

To reproduce the sounds, the needle was drawn away, and the cylinder was rotated backwards until the needle was brought to the point at which it started. The



Phonograph. Diagram illustrating method of producing sound waves. A, glass disk which receives vibrations from the point B, which moves up and down in the grooves in the cylinder

cylinder was then rotated forwards, and the needle allowed to run over the tin foil, the indentations in which caused the needle to vibrate, and the diaphragm to reproduce the original sounds. In the modern perfected machine, the metal cylinder covered with foil is replaced by a cylinder of wax or its equivalent, in which is cut the sound record. The vibrating diaphragm is commonly of glass, and the machine is driven at a high speed and a uniform rate by an electric motor or springs. *See Gramophone; Talking Machine.*

Phonography. System of rapid writing by signs representing sounds. It is better known under the name of shorthand. *See Pitman, Isaac; Shorthand.*

Phonolite (Gr. *phōnē*, sound; *lithos*, stone). In geology, name given to an igneous rock, consisting chiefly of nepheline and sanidine, together with augite, hornblende or biotite. Phonolites have chiefly been formed as lavas, and give out a distinctive clinking sound when struck by a hammer, giving them their alternative name of clink-stones. They decompose easily, owing to weathering into zeolite minerals, and are found in France, Germany, Italy, Cape Verde Islands, etc. *See Zeolite.*

Phormio (d. c. 428 B.C.). Athenian general. He commanded at Potidea and in Chalcidicē, and in 429 B.C. gained two notable naval victories over the Spartans during the Peloponnesian War, in the neighbourhood of Naupactus. In the first battle, Phormio's 20 ships beat the 47 of the Peloponnesians; in the second, his 20 beat the Peloponnesians' 77. His death shortly afterwards was a great loss to the Athenians, who erected a statue of him on the Acropolis.

Phosgene (Gr. *phōs*, light; root *gen*, to produce). COCl_2 . Alternative name for carbonyl chloride. A gas discovered by J. Davy in 1811, and possessing an unpleasant pungent smell. Used in the manufacture of aniline dyes and other organic chemicals, it is formed when chloroform decomposes, and by exposing equal volumes of carbonic oxide and chlorine to the action of sunlight.

Phosphates. Mineral deposits largely used in fertilisers. The phosphate rocks found in different parts of the world consist largely of fossilised animal remains or of mineralised guano. Rocks of this type may contain from 40 to 80 p.c. of tribasic phosphate of lime. The great value of this material is for fertilising pur-

poses. Phosphate, however, in its raw state, is not soluble in water. It therefore must be chemically treated and turned into superphosphate before its phosphoric acid becomes available as plant food. It was in 1845 that Henslow first called attention to the deposit of coprolites below the chalk in Surrey and elsewhere. Since then large deposits of phosphate have been discovered in France, Belgium, South Carolina, Florida, and Tennessee. The use of mineral phosphates for manure began in the middle of the 19th century. In 1921 over 5,000,000 tons of raw phosphates were worked up in fertilisers. *See Basic Slag; Manures.*

Phosphor Bronze. Alloy of bronze and phosphorus. It is used where great tensile strength or wear-resisting properties are required in parts of machinery, and where iron or steel cannot be used satisfactorily, particularly where the latter would be exposed to the action of salt water. It is employed for bearings of shafts, for pump rods and pump plungers, for valves and cocks, while the propellers for marine launches, motor-boats, destroyers, etc., are often made wholly of it. *See Alloy.*

Phosphorescence. Power of emitting light possessed by many animals. It occurs frequently among the Protozoa, jelly-fishes, worms, crustaceans, insects, and fishes, and more rarely in other phyla of the animal kingdom. The familiar phosphorescence of the sea is due to the presence of swarms of the protozoon *Noctiluca* (q.v.). Another well-known example is seen in the glow-worm, where the light appears to serve the purpose of attracting mates. In the jelly-fishes, phosphorescence accompanies the power of stinging, and is therefore, probably, of a warning character; while the angler fish uses it to attract the small species on which it preys. Among animals of the deep sea it serves apparently as an illuminant.

The means by which the light is produced is not yet fully understood, the phosphorescent organs differing greatly in character, while in the Protozoa the entire body protoplasm is luminous. It is probably akin to electrical phenomena, but beyond this nothing final can yet be asserted. The luminous qualities often noticed in dead or decomposing fish and crustaceans are due to the presence of phosphorescent bacteria, which belong to the vegetable kingdom.

A number of substances continue to emit light when placed in darkness after exposure to light. Phosphorus itself does so, but the

phenomenon is due to oxidation and not to true phosphorescence. Barium and calcium sulphides, all minerals containing aluminium, etc., are phosphorescent. Dewar has shown that phosphorescence increases markedly at very low temperatures. It has been shown that it depends upon the presence of a metal, a soluble flux, and a sulphide of an alkaline earth. Without them phosphorescence does not exist. *See Fluorescence.*

Phosphoric Acid. Compound of phosphorus, hydrogen, and oxygen, H_3PO_4 . It is made on a commercial scale by treating bone-ash or mineral phosphate with sulphuric acid in wooden vats and filtering off the phosphoric acid from the precipitated calcium sulphate. It forms a viscous liquid, and is a tribasic acid forming three series of salts, e.g. NaH_2PO_4 ; Na_2HPO_4 ; Na_3PO_4 ; the hydrogen molecules being gradually replaced. The salts of the acid are called phosphates. On heating the acid it is converted into pyrophosphoric acid, $\text{H}_4\text{P}_2\text{O}_7$, and heating still further results in the formation of metaphosphoric acid HPO_3 , a glassy solid.

Phosphorous Acid. H_3PO_3 . Acid formed when phosphorous oxide is added to water, the oxide being produced by the slow oxidation of phosphorus. A solution is obtained when sticks of phosphorus are kept exposed to moist air, but the pure acid is made by slowly passing chlorine through phosphorus melted under water. Its salts are termed phosphites.

Phosphorus (Gr. *phosphoros*, light-bringing). P. Chemical element which derives its name from its property of becoming luminous in the dark. It appears to have been discovered in 1669 by Brandt, an alchemist of Hamburg. In 1775 Scheele, the Swedish chemist, described a method of making phosphorus from bone-ash.

Phosphorus does not occur in the free state in nature, but exists combined as phosphate. It is always found in plants, from which animals derive the phosphate found in bones to the extent of three-fifths of their weight. Large deposits of mineral phosphates exist, which are now employed in place of bone-ash for the preparation of phosphorus. Pure bone-ash contains the equivalent of over 17 p.c. of phosphorus.

Phosphorus is chiefly made at Oldbury, near Birmingham, and at Lyons. Concentrated phosphoric acid is mixed with charcoal, and the dried mixture distilled in retorts. The process occupies about 16 hours. By the Readman,

Parker, and Robinson process phosphate is converted directly into phosphorus by means of an electric furnace.

Phosphorus is a pale yellow waxy-looking solid which readily takes fire when exposed to the air. It is converted into another variety known as red phosphorus by heating to a temperature of between 240° to 250° C. for a time. It is this variety which is used in the manufacture of matches. Phosphorus is also used in the preparation of vermin-killers, phosphor-bronze, and in the preparation of certain organic compounds. (See Phosphoric acid.)

Acute poisoning by phosphorus has occurred from taking rat-poison, and among children from sucking match-heads. From one to two grains are likely to be fatal. When swallowed, the poison causes a garlic-like taste in the mouth and odour in the breath. Pain, vomiting, and diarrhoea follow in from a quarter of an hour to several hours. Sometimes the symptoms become steadily worse, and delirium, coma, and convulsions precede death. Treatment consists in washing out the stomach, or giving copper sulphate as an emetic. Fatty material, such as milk, should not be given.

Photius (c. 820–891). Byzantine scholar and prelate. Born at Constantinople of a distinguished family, he became captain of the imperial bodyguard and secretary of state under Michael III. Although a layman, he was appointed patriarch of Constantinople, 857, deposed 867, reinstated 876, again deposed and banished 886. He died in exile in Armenia. During his second patriarchate the breach between the eastern and western Churches became complete.

Photius rendered great service to classical scholarship by two works, both extant in more or less complete form: (1) *Bibliotheca* or *Myriobiblos*, containing a description of 280 works by Greek theological, historical, medical, and miscellaneous writers, together with abstracts of the same, of varying length, accompanied by shrewd literary criticisms. It is curious that the poets are entirely omitted. The *Bibliotheca* is especially valuable as containing specimens of works, the originals of which are in many cases entirely lost; (2) a lexicon, in alphabetical order, of the words occurring in the Greek orators and historians. The first vol. of an Eng. trans., by J. H. Freese, appeared in 1920.

Photo-chemistry. Branch of chemistry which deals with chemical changes due to the action of

light. If a mixture of chlorine and hydrogen is kept in the dark, no chemical combination takes place, but if a beam of light be allowed to fall on the glass vessel containing the mixture, chemical combination takes place with explosive violence, hydrochloric acid being formed. Light also "reduces" many chemical salts, especially in the presence of organic substances. This fact is the basis of the operations of photography. The silver haloids, i.e. the bromide, iodide, and chloride of silver, are particularly sensitive to light, and these are used for the sensitive portion of photographic plates and papers.

Many other substances are sensitive to light, and some of these are employed also in photography. Light-sensitive iron salts form the basis of the ferro-prussiate paper devised by Herschel in 1840, and largely employed for making blue-prints in engineering workshops. Platinum salts sensitive to light form the basis of platinotype. Another class of photochemical action is seen in Niepce's discovery that thin films of bitumen exposed to light become insoluble in the usual solvents, such as turpentine. Similarly gelatin impregnated with ammonium bichromate becomes insoluble in water after exposure to light. The last named reaction is the basis of the carbon process of photography. In addition to the photochemical action which has been referred to, there are other theories involved in the explanation of photographic action. Two that may be mentioned are the molecular strain theory put forward by Professor Chunder Bose, and the ionization or electron theory elaborated by Professor Joly. See Chemistry; Photography.

Photo-copy Paper. Paper, rendered sensitive to light with iron salts, and used for the making of copies of drawings or tracings such as engineers' and architects' plans. They are of various kinds. Ferro-prussiate or blue-print papers, sensitised with iron ammonium citrate and potassium ferricyanide, yields a copy in white lines on a blue ground. Ferro-gallic paper, prepared with iron perchloride and gallic and tartaric acids, yields one in blue-black lines on a white ground. With both, the only manipulation is to wash the exposed papers in water. See Photography.

Photo-engraving. Process of making printing blocks from pen-and-ink drawings and other line originals by photographic methods. It consists essentially in forming on a zinc plate an image of the de-

sign, consisting of material which is an obstacle or "resist" to the action of an etching fluid. The parts of the metal representing the lines of the drawing are thus left standing in relief on the etched metal plate. The latter, when mounted on a wood block, is known as a line block or zinco, and is suitable for printing with type in a typographic press.

The method of preparing such blocks consists in: (1) making a photographic negative of the original to the required scale in a camera; (2) printing from the negative on to sensitised zinc; (3) converting the impression on the zinc into a resist capable of withstanding the acid used in (4) etching the zinc plate. The negative is most frequently made by the wet collodion process, although of late years dry-plates have come into use. It requires to be one in which the lines of the original are represented by clear glass and the ground by dense deposit. For printing from it on to zinc a solution of albumen (white of egg) and bichromate of ammonium is poured on the zinc plate, which is whirled to leave a thin sensitive coating and quickly dried over a gas-ring. The sensitised plate and the negative are pressed film to film in a strongly made printing-frame and exposed, usually to arc light. The exposure renders the albumen forming the lines insoluble in water and also retentive of greasy ink.

The plate is then inked all over very thinly with lithographic printing ink, which is thus fixed on the lines; that on the ground is cleared off by immersing the plate in water and rubbing it with cotton-wool. The thinly inked lines remaining on the plate do not suffice to protect the metal beneath them from the etching liquid, but require to be reinforced before etching is begun, and also by successive operations as etching is done, in order to prevent the etching liquid from attacking the sides of the lines. Unless means are taken to prevent this sideways etching action—or undercut, as it is called—the lines will be broken and ragged. See Engraving; Photo-Lithography; Process.

Photographic Society, ROYAL. The leading photographic society in Great Britain, founded in 1853. It has numbered among its presidents scientists like J. Glaisher and Sir W. de W. Abney. Meetings are held weekly from Oct. to June, and papers are read on the technical and artistic aspects of photography. The offices are at 35, Russell Square, W.C.

PHOTOGRAPHY: THEORY & PRACTICE

G. E. Brown, F.I.C., Editor, *The British Journal of Photography*

In this work various articles deal with subjects connected with photography, e.g. Camera; Developer; Lens; Negative, etc.

Photography, which essentially is the art or craft of recording the forms of objects by the action of light, was no doubt suggested by the desire to fix the picture or image produced in a camera obscura. The first person to suggest definitely the use of a substance sensitive to light for this purpose was Thomas Wedgwood, fourth son of the famous potter. According to a paper written in 1802 by Sir Humphry Davy, he rendered paper or leather sensitive to light by soaking in solution of silver nitrate, and so made copies of ferns, etc., by laying the sensitive paper behind them and exposing to light. But he could find no means of preventing further discoloration of the copies in daylight. Photography, as a practicable art, had its birth in 1839, when the inventions of six later and independent experimenters became known, viz. Joseph Nicéphore Niepce, Jacques Louis Mandé Daguerre, William Henry Fox Talbot, the Rev. J. B. Reade, Hippolyte Bayard, and Sir John Herschel.

Daguerre's Process

Niepce began in 1814 and completed about 1829 a process for drawing by light on the lithographic stone, metal, etc., and he devised a crude but workable process, depending upon the sensitiveness of bitumen (asphaltum) to light, of making intaglio-etched metal plates, from which he took impressions in ink. In 1829 he entered into a partnership with Daguerre, whose process was the fixing on a plate of silver or silvered copper of the image of the camera obscura. The silver metal was rendered sensitive by iodine vapour which formed a thin film of silver iodide on it, but the most remarkable feature of the process was Daguerre's discovery that the light produced an invisible action upon his sensitised plates. He rendered this latent image visible by exposure of the plate to mercury vapour and thus established a method, which, in altogether different forms, has been universal in photography. Daguerreotypes speedily became the fashion throughout the world, and remained in vogue until superseded some 15 years later by processes which were the outcome of the British trio of inventors.

Fox Talbot's experiments began in 1835. He made paper sensitive to light with silver nitrate,

but discovered that he could render prints immune to further action of light by soaking them in a solution of potassium iodide or of common salt (sodium chloride). Talbot made camera pictures by this primitive method and introduced the system of printing positive prints from negatives so produced. Within two years he greatly improved the process by making it a development one like Daguerreotype. This calotype process (*q.v.*) was patented and exploited by Talbot, and met with some success in competition with Daguerreotype, but the results, though much cheaper to produce, had not the delicate quality and intrinsic charm of the French process.

Herschel's Improvements

Herschel's contribution was that of an eminent chemist, who, on hearing rumours of Daguerre's invention, promptly set to work to do the same thing. Within a month he worked out a process like Talbot's, but used instead of iodide as the "fixing" agent, the hyposulphite of soda (*hypo*), which he himself 20 years before had shown to be capable of dissolving silver chloride. He now employed it as a means of getting rid of the silver compound not affected by the light. Herschel was apparently the coiner of the words "photograph" and "photography" and was the first to use the terms "positive" and "negative" in the now general photographic sense. Reade and Bayard independently devised means of rendering paper sensitive to light.

Following the calotype process, the next step was towards the use of glass instead of paper in the making of negatives, for the sake of its greater clearness and freedom from impurities. Albumen (white of egg) was used as the medium in which to hold the sensitive silver salts on glass plates, but this and other methods were quickly superseded by the invention in 1851 by a sculptor, Scott Archer, of the wet-collodion process, which for 30 years remained in universal use for making negatives despite its many drawbacks. In it a solution of nitro-cellulose in ether and alcohol is poured over the glass. This solution is called collodion, which name is applied also to the film left on the glass when the ether and alcohol have evaporated. The collodion contains also iodide, which forms silver iodide when the coated plate is immersed in a bath

of silver nitrate. This sensitive plate has to be exposed and developed while wet, and thus calls for a portable dark-room, but at the time it was a great advance on calotype in its greater sensitiveness and in the clear and grainless character of the negatives. The process was also largely used from 1855 for the making of positives little inferior to and much cheaper than Daguerreotypes. It now survives chiefly in the making of negatives for photo-engraving.

Many attempts were made to remove the great defect of Scott Archer's process—the necessary wetness of the plate—for which purpose the collodion coating was treated with various kinds of preservatives. None of these dry collodion plates came into general use, although some came on the market (1856–62) and were the first to be sold completely ready for use. But this form of the process advanced photography through the introduction for it by Major C. Russell in 1862 of an alkaline developer instead of the acid solution previously used. The more powerful action of the alkaline developer was utilised in the next step forward made in 1864 by J. B. Sayce and W. B. Bolton, who succeeded in dispensing with the separate silver sensitising bath. They formed silver bromide in the collodion itself in a state of fine division, i.e. as an emulsion which could be poured on to glass plates. Such plates were then dried, could be carried afield and developed at leisure, thus abolishing the outdoor paraphernalia of the wet-plate process.

Invention of Dry Plates

In 1871 experiments were begun on the use of gelatin instead of collodion for the preparation of sensitive emulsions. The first dry-plate gelatin emulsion—a very imperfect one—was that of Dr. R. L. Maddox. Succeeding experimenters sought to produce, not sensitive dry-plates, but the emulsion with which photographers were themselves to coat glass, but in 1877 plates were put on the market by J. W. (later Sir Joseph) Swan.

Until 1872 photographic plates, by whatever process prepared, were sensitive only to blue and ultra-violet rays of light. But in that year Dr. H. W. Vogel of Berlin discovered that addition of certain dyes to a sensitive collodion emulsion made it sensitive also to green and yellow rays. This principle was first applied commercially to gelatin emulsion in Germany, where colour-sensitive (orthochromatic) plates were used in 1883–84. With the invention of new

dyes, plates—so-called pan-chromatic—can now be made sensitive to every radiation from blue to red.

At the present day the sensitive coating on dry plates consists of an emulsion of silver bromide in gelatin, the composition and preparation of which vary according as the plates are required to be of high speed for instantaneous or portrait photography, or slow for copying or lantern-slide making. The emulsion is made by mixing weighed and dissolved quantities of silver nitrate and potassium bromide in warm gelatin solution. It is caused to set, the jelly shredded through canvas, washed in water, and "cooked" for a time and at a heat according to the sensitiveness required. Glass plates are machine-coated by causing the warm fluid emulsion to flow over them from a species of weir, are allowed to set and then dried, the operations being carried out in a red or deep green light according to the colour-sensitiveness of the emulsion.

Printing papers, in the earliest days of photography, were identical with those used for negatives, but with the introduction of the wet-collodion process albumenised or silver paper came into universal use. Paper was coated with albumen and ammonium chloride, and rendered sensitive by the photographer himself by floating

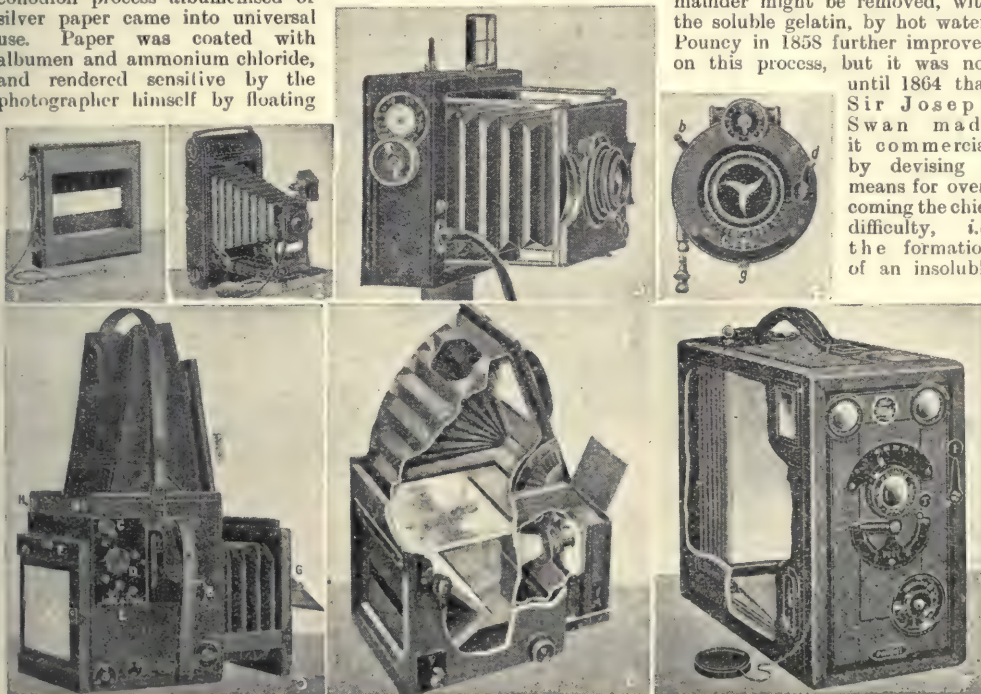
on a bath of silver nitrate. It kept in good condition only a few days, but in later years was made commercially to keep several months.

Exposed to daylight under a negative it yielded a print of ugly reddish colour, which was converted into one of pleasing purple by toning in a solution containing gold chloride. The prints were then fixed in hypo, which dissolved out the silver compounds undarkened by light. This paper was the only one in general use from about 1850 to 1892. In 1865 paper coated with collodion emulsion for printing-out and toning in this way was devised, but was little used. In 1882 Captain (afterwards Sir Wm.) Abney worked out a gelatin emulsion to be used in the same manner. Paper of this kind was first made in Germany, but did not displace albumen paper until its manufacture in 1891 by the Ilford Company, from whom it received the name P.O.P. (print-out paper).

There are now manufactured three chief varieties of such papers, i.e. P.O.P., bromide paper prepared with an emulsion akin to that of a dry-plate and requir-

ing to be developed, and gas-light paper, which is a much less sensitive variety of bromide, and may be handled without a dark-room, though it is rapid enough to be impressed when exposed for a few seconds behind a negative. A fourth variety, self-toning paper (*q.v.*), is P.O.P. with sufficient gold in the coating to dispense with the use of a separate toning bath, but paper of this kind, introduced about 1901, is usually made as a collodion emulsion. Bromide paper was made commercially as early as 1879, but its use and that of gas-light paper only became general some 12 years later.

A chromium compound (sodium or potassium bichromate) serves as the basis of several processes in a quite different way. It is not itself sensitive to light, but is so when mixed with substances such as gum or gelatin. The action of the light is to render the previously soluble gum or gelatin insoluble in water, as was first observed by Fox Talbot in 1852. In 1855 a French engineer, Poitevin, applied this fact to the making of prints by mixing the gelatin and bichromate with a pigment which was held by the light-affected gelatin whilst the remainder might be removed, with the soluble gelatin, by hot water. Pouncy in 1858 further improved on this process, but it was not until 1864 that Sir Joseph Swan made it commercial by devising a means for overcoming the chief difficulty, i.e. the formation of an insoluble



Photography. 1. Focal plane shutter. 2. Folding roll-film camera. 3. Folding camera with focal plane shutter; widely used for press photography. 4. Between-lens or diaphragm shutter, containing thin leaf segments which rapidly open and close: b, release; d, setting lever; g, setting pointer for diaphragm. 5. Reflex camera: A, position of sensitive plate; B, shutter release; C, knob for altering width of slit; D, winding key; E, adjustments for long and short exposures; F, rotating back; G, lens shade; H, catches for hood. 6. Diagram illustrating action of reflex camera. The rays from the lens are reflected by a mirror, and the picture is seen, through the hood, on the ground glass. 7. Magazine hand camera for plates, with side opened to show how the exposed plates fall to the lower part of the camera

skin over the surface of the print, preventing access to the soluble parts below it. This carbon process, still largely used, is one of the most beautiful photographic printing methods. A modern development of it is Ozobrome, invented by Thos. Manly in 1905. In 1904 the principle of the collotype process was applied to the making of prints; the pigment, in the form of printers' ink, was applied by hand. This is the oil process, a further development of which is Bromoil, devised in 1907 by C. Welborne Piper. In both these processes the picture is built up by hand application of a greasy ink; the camera supplies the drawing, but the tones may be largely controlled in inking.

Developing and Printing

The photographer's dark-room is really one illuminated by orange, deep red, or dim green light, according to the kind of plate handled in it. Roll-film is largely developed without a dark-room in tanks for the purpose. While plates can be treated on a similar system, they are commonly developed in a "dark-room" in shallow open dishes, or in grooved tanks.

Plates are next "fixed" in a 25 p.c. or 30 p.c. solution of hypo for rather longer than is required for the semi-opaque white emulsion left undarkened by the developer to dissolve, and the clear negative is then washed in clean water for about an hour, to remove the hypo, and is put to dry.

In making prints from negatives the materials most used are bromide and gaslight papers on account of their manipulation throughout by artificial light. Photographs made on these papers are of cold black "colour," but by subsequent treatment can be toned brown, sepia, red, blue, green, and other colours. The papers themselves are made in a wide range of surfaces from glossy to others resembling canvas.

The platinum and carbon printing processes are less generally used, although they yield the very finest forms of photograph. Platinum prints may be either black or sepia, but the carbon process allows of any colour of print being made.

Bibliography. Instructions in Photography, W. de W. Abney, 11th ed. 1905; A Primer of Photography, O. Wheeler, 1910; Photography of To-day, H. C. Jones, 1913; Dictionary of Photography, 10th ed., E. J. Wall, 1920.

Photogravure. Photo-mechanical process of making printing plates, known also as intaglio or rotogravure. In photogravure the shadows of the original are represented by cavities in the printing surface, and the light portions by

the bare metal. The image of the original is etched into the plate, the deepness of the etching varying with the depth of tone of different parts of the original. When an impression is taken, the ink is withdrawn by the paper from the recessed parts of the plate by pressure.

Photogravure possesses a softness of tone superior to the usual newspaper illustration reproductions known as half-tone, with which it is competing successfully; it is much used for editions de luxe. When wood-engraving

PHOTO-LITHOGRAPHY

A. B. Blayney, of The Amalgamated Press, Ltd.

This article is one of a group dealing with illustrations for periodicals of all kinds. See Colour Printing; Half-tone; Intaglio; Lithography, with colour plate; Offset; Photography; Printing; Process

Photo-lithography is a method of reproducing a subject photographically on to a flat surface from which the subject can then be printed lithographically. The fundamental difference between it and chromo-lithography is that most of the hand drawing described under the latter heading is almost eliminated, being brought into use only for touching up or improving the functions of the camera. One method is to take a negative of the subject and print it upon sensitised transfer paper which has been coated with gelatin; after exposure, the print is rolled with transfer ink and dipped in water, which absorbs the gelatin, allowing the ink to be removed where no photographic print was made. The transfer is impressed on to a printing plate, which can be duplicated in sets by transferring on to the machine plate. This method is largely adopted for the reproduction of subjects which have been drawn in straight or curved lines, dots and grain, and is used in the execution of auctioneers' plans, railway maps, and, being photographic, the original subject can be reduced or enlarged.

Photography on Metal Plates

A later development is by photography direct on to the printing plate. This is akin to the 3- or 4-colour half-tone relief process, but printed from a flat surface. The advantages are the elimination of stereotypes and the substitution of a cheaper paper for the expensive glazed variety required by the relief method, and with no deduction from the ultimate result; in fact a more faithful reproduction is attained.

Direct photo-lithography is now applied to the reproduction of fine colour-prints, magazine covers and works of art, for all of which it is superseding chromo-lithography.

reached the highest point of commercial development, the half-tone block supplanted it by reproducing the original subjects more faithfully and more quickly. In turn, photogravure and photo-lithography are superseding the half-tone block by reason of the artistic results attained. A notable application of photogravure was seen in the illustrated supplement added to The Times weekly edition in 1920. See Half-tone; Intaglio; Lithography, col. plate; Printing; Process.

The original painting or sketch is placed before the camera and a negative secured through a sheet of lined or dotted glass (termed a half-tone screen) interposed between the sensitised plate and the lens, the colours of the painting being extracted from each other through colour filters. Thus, when a picture as represented by the subject on the unglazed side of the coloured diagram facing page 4916 is to be reproduced in several colours, original negatives of each of these colours are made, and the work of the camera is enhanced by touching up by hand where necessary. These colours are transferred photographically from the negatives to the same number of lithographic master printing plates, one colour only on each, these plates being proofed, and tested progressively in the same way as a chromo-lithographic print, to reproduce a replica of the original painting.

In practice it has been found that while the original photographic lithographic plate gives a perfect reproduction if printed from direct, the detail and sharpness become blurred if duplicated by hand transferring as applied to chromo-lithography. A revolutionary method enables the image to be photographically duplicated into perfect register on to the machine plate direct from the one negative, the operation being repeated so that there may be 16, 32, or more sets of the same subject on a machine plate, each set virtually an original, and equal to the master plate.

The negative is placed in a duplicating machine which reproduces the image of the negative in the exact position required on to a sensitised machine plate, say 16, 32, or more times as the case may be. One set will be secured on each

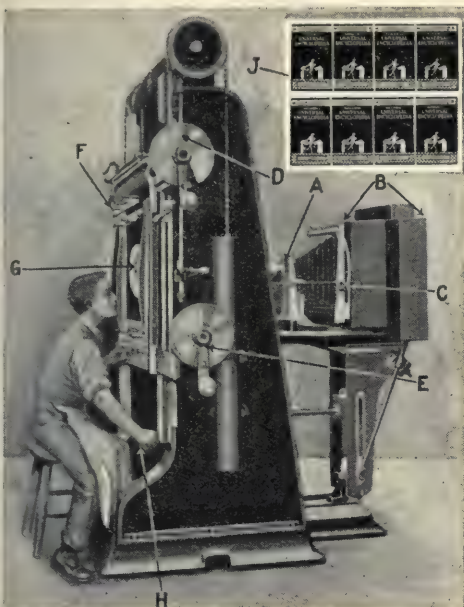


Photo-Lithography. Machine for multiplying a design from original negative on to a larger negative. A. Lens. B. Lantern containing original negative in frame C. D. E. Dials controlling movements of multi negative G. H. Wheel regulating size of projected image. J. Printed sheets. See text

plate after each exposure, so that each set is not a secondary impression as in the case of hand transferring. Thus, there may be six large machine plates with the six colours all in perfect register, each having its own original 16 or 32 times as required. So efficiently does this method fulfil all requirements of colour registration, that the delicate levers in conjunction with dials move the large machine plate vertically and horizontally to within a thousandth part of an inch. Afterwards the exposed plate is rolled with ink, when the image clearly appears and the multi plate is then ready for the printing machine.

An alternative method of duplication is by a repeating camera or projector like a cinema lantern, which repeats a subject from the master negative on to a larger one as many times as desired, i.e. instead of duplicating from the negative on to a machine plate direct, it repeats the negative photographically, one original of one subject 16 or 32 times or more on to another negative all in register. Thus a large multi negative with 16 or 32 set thereon is obtained, which is substituted for the single negative. This latter device is used largely for repeating on printing

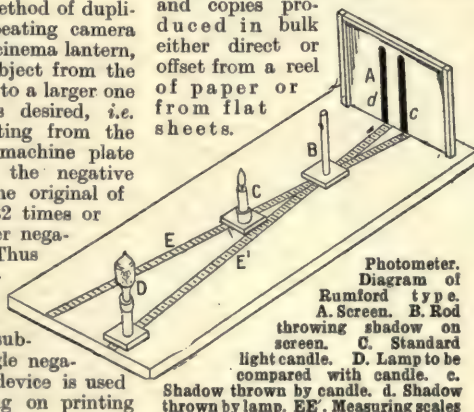
plates, postage stamps, small labels, and paper script where large quantities are required.

A multi negative having been obtained, the next procedure is to transfer the subjects thereon to the printing machine plate en bloc; the machine plate, having been sensitised, is fitted into a printing-down frame and the multi negative placed upon the top of it. Close contact between negative and plate is ensured by the extraction of all air, and it is then exposed to a powerful light. The machine plate is now taken from the frame and rolled with ink, which adheres to the images secured from the multi negative by the exposure.

When a subject is to be printed is to be printed respectively (1) offset, (2) direct, the subject on the machine plate has to be (1) the same view optically as the original painting instead of reversed as in the case of (2) direct printing, and the cycle of the photographic operations is provided for beforehand accordingly.

The machine plates made by either of these two distinct photographic methods of duplication, i.e. (1) from the single negative direct to the machine plate, (2) by means of a multi negative, have a life, value, and sharpness of detail not possessed by the older methods.

The machine plates produced by any of the methods described are next fitted into the printing machine and copies produced in bulk either direct or offset from a reel of paper or from flat sheets.



Photometer. Diagram of Rumford type. A. Screen. B. Rod throwing shadow on screen. C. Standard light candle. D. Lamp to be compared with candle. d. Shadow thrown by candle. EE'. Measuring scales

With the advent of the offset principle of printing off and a better adaptation of photography the whole cycle of lithographic printing is in a further state of evolution endeavouring to outstrip its older companion typography, and to keep pace with its newer rival photogravure. The introduction of photo-lithography used in conjunction with offset machining has given it a new lease of life, and extended its possibilities so greatly that much of the work which has hitherto been done by letterpress printing can be done equally well, if not better, by lithography, and at a lower cost. The excellence of the combined process can be seen in most art depots, where there are prints so like the originals as to be easily mistaken for them; to some extent letterpress relief illustrations supplanted lithography, and the latter is now getting its revenge with the aid of photographic science.

Attempts are being made to print newspapers by photo-lithography with some measure of success, and if by this process costly stereotypes can be dispensed with its economic value will be apparent. The outstanding difficulty of securing a lithographic plate with a long life, and from which a vast number of newspaper impressions can be printed at a very high speed, is being overcome by a hardening process.

When a planographic plate fulfils the requirements of the printer in the directions referred to, having regard to the economy effected, both in time and cost, the stereotype will, it is predicted, become as obsolete as the woodcut for newspaper production.

Photometer (Gr. *phōtos*, of light; *metron*, measure). Instrument for measuring the actual intensities of light, usually against some standard source. The standard in use in Great Britain is the candle power, the light produced by a sperm candle one-sixth of a pound in weight and burning 120 grains of wax to the hour. Such a standard is unsatisfactory, because of the difficulty of obtaining uniformity in the composition of the wax and a wick that will burn uniformly. The Carcel lamp, the French standard, burns colza oil at a fixed rate, and is more satisfactory. Other standard sources of light which have been proposed are that given out by a square centimetre of melted platinum, that from a square millimetre of a pure carbon arc, the acetate of amyl lamp of Hefner, etc.

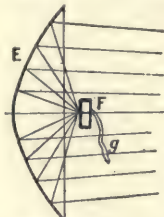
In a Bunsen photometer a white screen has a grease spot at its centre. The lights to be compared

are mounted on opposite sides of the screen, and their distances adjusted so that the grease spot is invisible: the intensities of the two lights are to one another as the squares of their distances from the screen. In a Rumford photometer a vertical rod is mounted in front of a screen, and the positions of the sources of light are so adjusted that the two shadows which they cast are substantially equal. For determining the intensity of a bright light, such as an electric arc, a dispersion photometer may be used. The dispersive effect of a thin concave lens acts, as the increased distance in the common photometer, to reduce the intensity of the light to the required degree. Polarisation, wedge, wheel, and other photometers are also well known.

Photophone (Gr. *phōs*, light; *phōnē*, voice). Instrument for transmitting sounds by means of light. The instrument depends upon the varying electrical resistances of selenium under the action of light. In its essentials a beam of light falls upon a thin, flexible mirror which forms a diaphragm similar to that of a telephone. The reflected light from the mirror passes through a lens, and thence to another receiving mirror, which concentrates it on a selenium cell connected with an electric battery and telephone. The vibration of the first mirror, due to speech or other sound, scatters the light and sends intermittent rays through the lens, and so to the selenium cell. The variation of light on the selenium provides the variation of electric resistance, which enables corresponding sounds to be heard in the receiving telephone. Lamplack has been substituted for selenium (*q.v.*).

Photo-Sculpture. Process by which it is possible to photograph a person or object in such a way

that from that photograph a carving, in relief or intaglio, can be made in ivory, alabaster, wood, or other hard material. The inventor was H. M. Edmunds, of Brighton. The apparatus consists, in the first place, of an optical projector (magic lantern) with a long focus and well-corrected lens, illuminated by an incandescent lamp of high candle power. The lantern slide is a "spiral" photograph on plate glass, the "spiral" being accurately drawn in a form like that of the groove of a gramophone record. This spiral is focused upon a plain surface at 9 or 10 ft. from the projector lens. To the side of the projector is fixed



Photophone. Diagram illustrating principle of the instrument. A. Lens concentrating light on silvered glass mirror, B, which forms part of receiver. C. D. Lens directing reflected light from mirror on parabolic reflector, E, which concentrates light received on selenium cell, F, attached to a telephone receiver by connexion, G. H. Mouthpiece



a camera in such a way that the optical axes of the projector and camera lenses are parallel.

The spiral projected on the plane surface is then photographed in the ordinary way, the negative obtained is enlarged on an opal glass, and the resulting record is then placed on a moving carrier that forms part of the

"carving machine"; the other two main elements of this machine being (1) a face-plate, which holds the material to be carved, and (2) a high-speed drill and microscope mounted up together, which can be moved by a controlling lever. The movement of the carrier of the photographic record is mechanically connected with the movement of the material to be carved, so that the one corresponds exactly to the other when the lever is operated. The operator, with his eye pressed to the upper end of the microscope, merely has to follow the lines, enlarged by this instrument, which are indicated on the photograph, moving the microscope to do this with the controlling lever. The drill is moved at the same time as the microscope, so that it cuts the material at varying depths according to the form of the original object, and the relief or intaglio is evolved.

In regard to material, the best results have been obtained in alabaster by the inventor, but various woods and ivory have also proved very adaptable. Any number of sculptured copies required can be made from the single photographic record.

Photosphere. In astronomy, the visible surface of the sun. The main body of the sun consists of gases under enormous pressures. On the surfaces these gases become highly incandescent, and give a continuous spectrum. That part of the surface is the photosphere; above it is another gaseous envelope, the chromosphere. The photosphere has the appearance of snowflakes which are beginning to cover a dark background. Large breaks appear in the photosphere, the so-called sun-spots, first noticed by Fabricius in 1610. These spots vary in size, from a few hundred miles across to huge chasms thousands of miles wide, and sometimes last many months. In the neighbourhood of many of the sun-spots there often appear bright streaks or patches in the photosphere. These bright streaks are known by the name of faculae, or little torches. They are more distinctly seen near the edge of the sun, where the general brightness of the surface is lessened by the greater thickness of the absorbing atmosphere. The photosphere does not revolve evenly, the lower latitudes moving faster than the higher, a fact established by observation of the time taken by the spots to travel across the face of the sun. The general appearance is mottled



Photo-Sculpture. Carving machine with which the operator, his eye at the microscope, follows the lines on the photo, and simultaneously operates the drill on the material affixed to the face-plate on the right. Top, right, spiral photograph of the inventor. See text

in the telescope, and its mean temperature has been calculated to be 7,000° C. See Sun.

Phototherapy. Treatment of disease by the influence of light. See Finsen Light.

Phraates. Name of several kings of Parthia. The best known was Phraates IV, who, on coming to the throne, 37 B.C., eliminated possible rivals by murdering his father, his 30 brothers, and even one of his sons. He successfully defended his kingdom against a Roman expedition under Antony, 36 B.C., but his tyranny caused a revolution and he was expelled. Reinstated with the help of the Scythians, he drove out Tiridates, who had been made king in his stead. The latter, however, took with him in his flight to Rome the youngest son of Phraates. This boy the emperor Augustus agreed to restore to his father on condition that the Parthians gave up the standards they had taken after the defeats of Antony and of Crassus at Carrhae in 53 B.C. Phraates was poisoned by his wife, c. 4 B.C. *Pron.* Pray-ayteez.

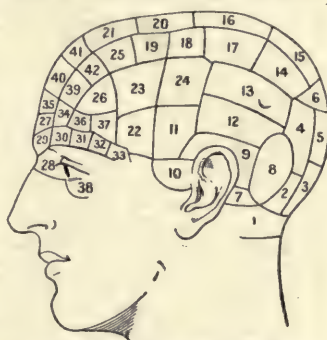
Phrase (Gr. *phrazein*, to speak). Literally, two or more words expressing a single idea. By phrasing is understood the wording of a speech or writing. A phrase book is a book containing or explaining phrases. (See Style.)

In music the term has much the same connotation. Music possesses melodic progressions and harmonic cadences, which largely represent the comma, semicolon, and full stop, and define the subordinate clause, the phrase, and the complete sentence. In musical performance the word phrasing also includes the artistic attachment and detachment of the tiny figures or sub-clauses, the proper use of legato, and the delivery of accents in due proportion. See Musical Expression, M. Lussy, Eng. trans. M. E. Glehn, 1855; Dictionary of Music and Musicians, vol. iii, G. Grove, 1904-10.

Phratry (Gr. *phratría*, brotherhood). Tribal or kinship division. In early Athens the tribe comprised three phratries, which developed into politico-religious fraternities. An Australian tribe usually embraces two exogamous moieties, each with a totem-name; for instance, Eagle-hawk and Crow, Emu and Kangaroo. Each phratry includes two or four exogamous classes, thereby securing an equitable distribution of the food-stock. Some N. American Indian tribes were organized into two or more phratries, each comprising one or more matrilineal clans or patrilineal gentes. See Greece.

Phrenic Nerve (Gr. *phrên*, diaphragm). Nerve formed by the third and fourth cervical nerves and a branch of the fifth on each side of the neck. It passes down the neck, and, having traversed the cavity of the chest, supplies the diaphragm or large horizontal muscle, which separates the thoracic and abdominal muscles. Division of the phrenic nerve leads to paralysis of the corresponding half of the diaphragm and may cause serious disturbance of respiration. See Nerve.

Phrenology (Gr. *phrên*, mind; *logos*, science). So-called science having for its basis the supposition that mental faculties and traits of character can be gauged from the shape and size of the skull. It is claimed that the brain is a congeries of organs, through each of which a distinct power of intellect is manifested. The strength of each mental organ is judged by the extent of the cerebral development,



Phrenology. Diagram indicating the sections into which the skull is divided phrenologically. See text

due allowance being made for quality of brain, combinations of organs, etc.

The founder of phrenology was F. J. Gall, who sought to demonstrate that there was a concomitance between talents and dispositions and particular forms of heads. Gall mapped out, as it were, the surface of the skull into twenty-six patches, and named them according to the mental or moral faculties he supposed they represented. Johann Gaspar Spurzheim, a German physician, studied the system under Gall, elaborated it, and through his lectures and books introduced phrenology to the people of Great Britain. He increased the faculties to thirty-five, and modern phrenologists have added a further seven.

Whatever vogue phrenology has obtained in Great Britain is due, after Spurzheim, to the Scottish brothers, George and Andrew Combe, who did much to make the system popular. Bernard Hol-

länder, M.D., through his books, *Functions of the Brain* and *Scientific Phrenology*, raised the system as near to the level of a science as it is ever likely to become. As an indication, on broad lines, of the power of the faculties, phrenology may be useful, but its specific claims are rejected by science. Even when the localisation of the functions is admitted, there is little or no proof that they affect the form of the skull or indicate the power or quality of the brain.

The forty-two sections into which most phrenologists divide the skull are as follows. The position of the sections is indicated by the diagram.

1. Amativeness. 2. Conjugality.
 3. Parental Love. 4. Friendship.
 5. Inhabitiveness. 6. Continuity.
 7. Vitativeness (love of life). 8. Combativeness.
 9. Destructiveness.
 10. Alimentiveness. 11. Acquisitiveness.
 12. Secretiveness.
 13. Cautiousness.
 14. Approbativeness.
 15. Self-esteem.
 16. Firmness.
 17. Conscientiousness.
 18. Hope.
 19. Spirituality.
 20. Veneration.
 21. Benevolence.
 22. Constructiveness.
 23. Ideality.
 24. Sublimity.
 25. Imitation.
 26. Mirthfulness.
 27. Individuality.
 28. Form.
 29. Size.
 30. Weight.
 31. Colour.
 32. Order.
 33. Calculation.
 34. Locality.
 35. Eventuality.
 36. Time.
 37. Tune.
 38. Language.
 39. Causality.
 40. Comparison.
 41. Human Nature.
 42. Agreeableness.
- See Anatomy; Brain; consult also Revival of Phrenology, B. Hölländer, 1901; Phrenology, J. C. Spurzheim, rev. ed. 1908; Phrenology, W. P. Thornton, 5th. ed. 1916.

Phrygia. Ancient country of Asia Minor. It comprehended roughly the tableland of modern Anatolia as far E. as the river Halys, but its confines varied at different times. It was inhabited by the Phryges, who, according to the researches of archaeologists and ethnologists, in agreement with ancient tradition, were warlike settlers of Aryan descent from Thrace. The inhabitants displaced by these invaders, probably about 1200 B.C., appear to have been of the same mixed race as the Hittites, to whose empire they may possibly have belonged.

Tradition, confirmed by modern research, also asserts the existence of a powerful Phrygian monarchy, beginning at an unknown date and lasting till the beginning of the 7th century B.C., when it was overthrown by the great Cimmerian invasion. The names of Midas and Gordius, well known in legend, are associated with this Phrygian monarchy. When the Cimmerii were driven

out by Alyattes, founder of the Lydian empire, Phrygia passed under the dominion of the latter, to pass in turn under that of the Persians, when the Lydians were subdued by Cyrus.

After the overthrow of the Persian empire by Alexander, Phrygia became part of the Seleucid kingdom, and it was during this period, about 260 B.C., that the invasion of Asia Minor by the Gauls resulted in a slice of Phrygian territory, known henceforth as Galatia, being settled by Gauls. Eventually Phrygia became incorporated in the Roman empire. The music of Greece owed much to Phrygia, which was devoted to the wild orgiastic cults of Cybele and Dionysus. See Descriptions of Ancient Monuments of Lydia and Phrygia, J. R. Stuart, 1842; Journal of Hellenic Studies, 1881, etc.; Cities and Bishoprics of Phrygia, W. M. Ramsay, 1895-97.

Phrygian Mode. In music, third of the church modes, E being its final and C its dominant. The semitones fall between the 1st and 2nd, and the 5th and 6th degrees. The Phrygian Cadence (minor key only) is when the first inversion of the subdominant precedes the dominant chord.

Phrynē. Greek courtesan of the fourth century B.C. She sat to Apelles as model for his great picture of Aphrodite rising from the sea. Indicted on a charge of profaning the Eleusinian mysteries, she was defended by the orator Hyperides, who is said to have secured the verdict in her favour by rendering her robe and exposing her charms.

Phrynichus. One of the oldest Greek tragic poets, a native of Athens. His best known plays, in which he was the first to introduce dialogue, were the Capture of Miletus by the Persians, which so affected the audience that all future reference to it was forbidden; and the Phoenician Women, a lament for the defeat of Xerxes at Salamis, put on the stage by Themistocles to glorify his share in that event. Another Phrynichus, a sophist of Bithynia, lived in the 2nd century A.D. He was the author of a work called The Atticist, containing a collection of Attic and non-Attic expressions.



Phylactery and thong by which it is bound to the forehead or arm

Phthalic Acid, $C_6H_4(COOH)_2$. White crystalline substance manufactured from naphthalene. The tetrachloride of naphthalene is first prepared by grinding naphthalene with water and potassium chlorate, carefully drying the mixture, and then adding it in small quantities at a time to strong hydrochloric acid. The naphthalene tetrachloride thus obtained is treated with nitric acid, phthalic anhydride being formed, which is converted into phthalic acid by boiling with an alkali. Phthalic anhydride is used in the manufacture of dyes and for making phenolphthalein.

Phthisis (Gr., wasting away). Literally, disease accompanied by much wasting of the tissues. The term is now restricted to tuberculous disease of the lungs. See Tuberculosis. Pron. thy-sis or ty-sis.

Phulkian States. Group of three native states of India, in the Punjab. They occupy a semi-arid area between the Jumna and the Sutlej, N. of Rajputana. The chief crops are native food grains. The three rulers are direct descendants of Phul, who died in 1652, after having established his authority over the area, which came under British protection in 1809. Total area, 7,599 sq. m. Pop. 1,928,000. See Jind; Patiala; Nabha.

Phycomycetæ. Division of fungi consisting of single-celled threads, which form a mould-like feltwork. The familiar white mould (*Mucor mucedo*) that forms on jam and other sugary substances is a good example. Examination of this with a lens shows that the erect branches that arise from the feltwork end above in a globular head, which is filled with the dust-like spores. The Potato-blight (*Phytophthora infestans*) and the Salmon Disease (*Saprolegnia ferax*) are also included in this group.

Phylactery or FRONTLET (Gr. *phylakterion*, safeguard). Among the Jews, strips of parchment inscribed with passages from Ex. 13 and Deut. 6, enclosed in a black calf-skin case, and fastened by thongs to the forehead or left hand or arm, the command in Deut. vi, 8, being literally interpreted. Used as early as the 3rd century B.C., and alluded to by Josephus, phylacteries, or tephillin, by reminding the wearer of the Divine law, served to protect him against sin. Modern Jews wear them on an undergarment called a *tallith* or prayer-veil. They are not worn by

the Karaite Jews, and are only alluded to once (Matt. xxiii, 5) in the N.T. The word is sometimes used to describe a case containing relics of the dead. See History of Amulets, Charms, and Talismans, M. L. Rodkinsohn, 1893.

Phyllite (Gr. *phyllon*, leaf). In geology, a group of clay rocks resembling slates, containing muscovite or white mica. Though the rock splits readily, it is uneven in its cleavage, and too soft to use for general building purposes. Phyllites are found in many parts of the United Kingdom, Europe, America, etc.

Phyllocactus. Small genus of leafless succulent shrubs of the natural order Cactaceæ, natives of



Phyllocactus. Flower of the leafless tropical American shrub

tropical America. They have flattened green stems and branches with notched edges. From the notches are produced the large, showy, red, rose or white flowers, which have a tubular calyx, numerous petals and stamens, and the long style spreads at the top into the many-branched stigma. Several of the species have flowers from six to 12 ins. across.

Phylloxera. Genus of insect pests of the natural order Hemiptera. They are very similar to green fly (*g.v.*), and one species, *P. vastatrix*, the grape-louse, chiefly infests grape vines. They cause destruction by laying eggs under the bark of the vines, and when hatched out destroy the whole plants, including the roots, if they are not dealt with in time. Spraying or washing with bisulphide of carbon is an excellent remedy for small vineries, but where the disease is on a large scale frequent spraying with petroleum emulsion is said to be the most efficacious remedy.

Introduced in vines imported from N. America, the phylloxera appeared in Europe about 1863 and in a few years spread through all the vine-growing countries,

causing enormous damage, especially in France. Drastic legislation has checked the evil, and in 1878 an international convention was concluded for concerted measures to be taken.

Phylogeny (Gr. *phylon*, race; *genesis*, origin). Biological term for the study of that part of embryology which may be expected to throw some light upon the origin of a race or species. See Embryology.

Physic (Gr. *physis*, nature). Term meaning the science of medicine. It survives in the official titles of certain professors and others, also in the term physician; but in general use it has been supplanted by the word medicine. Physic garden is a term which was used formerly for a botanic garden. A notable physic garden is that at Chelsea, London, established by the Apothecaries' Society about 1676. See Medicine; Sloane, Sir Hans.

Physical Training. Systematic exercise for the promotion of health and the development of the body. The earliest form of physical training or physical education was that practised by the ancient Greeks in the palaestra (*q.v.*), and consisted chiefly of running, jumping, wrestling, and discus throwing. The Greek example was followed by the Romans, and later various kinds of physical training, mostly of an athletic description, were adopted by other European countries; but it was not until the second half of the 18th century that the value of systematic methods was fully appreciated.

Schools of physical culture were established in Germany, Denmark, and elsewhere, one of the most celebrated of these being the Royal Central Institution of Gymnastics, founded in Stockholm in 1814 by Per Henrik Ling, to whom the present high standard of Swedish physical instruction is largely due. His example was followed by Adolf Spiess in Germany, which country much developed its system in the second quarter of the 19th century.

The development of the muscles is not the only consideration in systematic physical training, and careful attention has to be given to the brain, the bones, the ligaments, and the organs. Methods vary according to the country in which they are practised, and the exercises may be performed with or without apparatus.

The Swedish system, often referred to as "free movements," is practised without apparatus, and is now adopted in Great Britain. It was an important part of the training of the British soldier during the Great War, and forms the

basis of the syllabus of physical exercises for public elementary schools issued by the board of education. It is divided into groups, each group concentrating on the development of a certain part of the body—the neck, trunk, arm, leg, foot, ankle, etc.—and has the advantage over other systems that it can be practised where space is limited.

In Germany, where, as in France, physical training is under state control, "free movements" form only the preliminary exercises of the system, which passes on to strenuous movements requiring a variety of complicated appliances. In England, France, and America the systems are similar in character, the "free movements" being combined with exercises for which appliances are necessary, one distinct difference being the use in America of the pulley apparatus, which is not utilised in the other countries. The usual apparatus includes the vaulting-horse, the flying rings, the parallel and horizontal bars, and the trapeze.

Physical training now forms part of the curriculum in the schools of most countries, the scholars of British schools usually practising recreative gymnastics, *i.e.* exercises given in the form of recreation, such as musical drill. Correct breathing is a vitally important factor in all branches of physical training, and certain exercises consist entirely of inhaling and exhaling. Much benefit may be derived by taking 10 to 15 minutes' Swedish drill night and morning, but where the exercises are performed indoors a window should always be opened to permit of good air being breathed. See Drill; Eurhythmics; Gymnastics; Swedish Drill.

Physician. One who practises medicine. At one time qualifications to practise medicine or surgery in the United Kingdom could be given separately, but under an Act of 1858 no person can be registered as a medical practitioner unless qualified in medicine, surgery, and midwifery. See Medicine.

Physicians, ROYAL COLLEGE OF. Medical corporation founded by Henry VIII in 1518. Linaero was



Royal College of Physicians, arms

its first president. The college was for many years in Warwick Lane, but now occupies a handsome building in Pall Mall East, London. It possesses a fine library containing many rare books, and has an interesting collection of objects associated with

great physicians of the past, including portraits. The college consists of licentiates, members, and fellows. The first two are admitted by examination, licentiates being usually physicians who devote themselves to general practice, while members are generally consultants. Fellows of the college are elected from the members in recognition of professional distinction. The college of physicians issues an official volume, *The Nomenclature of Diseases*.

The Royal College of Physicians of Edinburgh is a Scottish medical corporation founded in 1681. Its present constitution is laid down in a charter of 1861. It unites with the Royal College of Surgeons, Edinburgh, and the Faculty of Physicians and Surgeons, Glasgow, to conduct examinations and grant degrees in medicine and surgery as far as Scotland is concerned. Its headquarters are in Queen Street, Edinburgh.

The college of physicians in Dublin was founded in 1654 by Dr. John Stearne, fellow and professor of physic, Trinity College, Dublin, and incorporated by royal charter, 1667. In 1692 it was re-incorporated in 1692 under the title of The King's and Queen's College of Physicians in Ireland, and in 1890 the title of Royal College of Physicians in Ireland was conferred by Supplemental Charter. The college grants fellowships, memberships, licences, licences in midwifery, and, conjointly with the Royal College of Surgeons in Ireland, diplomas in public health. Registrar's address, 6, Kildare Street, Dublin.

Physic Nut (*Jatropha purgans*). Shrub or small tree of the natural order Euphorbiaceae, native of tropical America. Its alternate leaves are heart-shaped or three to



Royal College of Physicians of Edinburgh, arms



Physic Nut. Leaves and flowers of the tropical American shrub

five-lobed. The small green flowers form small, loose clusters. The fruit is a black, fleshy berry, containing three seeds, which contain a good deal of oil, and have the flavour of almonds. The expressed oil is used for burning in lamps, and for medicine as a purgative.

Physics. Branch of science concerned with the fundamental laws of the material universe. It deals with the general properties of matter and the manifestations of various forms of energy. It may broadly be divided into two heads, laboratory physics and mathematical physics. Under the former, research work is carried on to obtain the necessary data which enable the postulates and axioms of mathematical physics to be stated.

Mathematical physics, a branch of science which has become of great importance in recent years, is concerned with obtaining axioms and postulates which will enable rigid mathematical rules to be formulated to satisfy observed phenomena. The theories of matter, energy, etc., all come within the domain of mathematical physics.

In 1920 an institute of physics was formed in Great Britain under the auspices of the Faraday Society, the Optical Society, and the Physical Society of London. The first president was Sir Richard Glazebrook, F.R.S. See *Energy*; *Matter*; *Relativity*, etc.

Physiocrats (Gr. *physis*, nature; *kratein*, to rule). Name given to an 18th century school of French economists. Founded by François Quesnay (*q.v.*), they taught that the land is the source of all wealth, and agriculture and mining the only industries that produce wealth. They were strongly opposed to the mercantile system then dominant in France and to a lesser extent in England, and one product of their teaching was the demand that all taxation should be paid from the produce of the land. Their doctrines had been put forward earlier by Richard Cantillon, but Quesnay and his friends, calling themselves the Economists, were responsible for their extension. Dupont de Nemours, one of the school, was responsible for the name. See *Political Economy*; *Smith, Adam*; consult also *The Physiocrats*, H. Higgs, 1897.

Physiognomy (Gr. *physis*, nature). Art of judging character from external features, especially the face. Aristotle wrote about it, finding a certain resemblance between men and the qualities of the animals that in feature they resembled. Many other writers, both

in classical times and later, dealt with the subject, and it was a popular subject for theories of all kinds. Professors of physiognomy sprang up, many of them charlatans, and in 1743, in England, an Act was passed providing that all those pretending to be skilled therein should be punished. In the 19th century the development of the theory of evolution and scientific studies generally took the place of the older physiognomy. There is, however, a modern and scientific form of physiognomy, which may be described as a study of the emotions as expressed by the muscles. This is useful in criminology. See *Criminology*; *Phrenology*; *Psychology*.

PHYSIOLOGY AND ITS PROBLEMS

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Articles on related subjects include *Biology*; *Botany*; *Cell*; *Life*.

See those on the various parts of the body, e.g. *Brain*; *Ear*;

Heart; also *Anatomy*; *Medicine*; *Protoplasm*; *Surgery*

Physiology forms one branch of biology, and deals with the functions, as distinct from the structure, of living organisms, whether plants or animals. The physiology of plants is usually included in the science of botany, and the physiologist is primarily concerned with the functions of animals. The term function is used to mean the characteristic actions performed by an animal or by its constituent parts; thus the ear is concerned with the function of hearing.

The study of even the simplest forms of animal life throws light on the functions of those higher in the scale of evolution, since certain characteristic functions are displayed by all animals. In the first place they possess the power to take in food, to build this up into their own substance, and to reject the waste products formed during this process. The power to grow in size represents one aspect of this function. In the second place, they are able to reproduce themselves, thereby giving rise to other animals. Finally, they are influenced by changes in their surroundings, these changes acting as stimuli to which they can respond by some alteration within themselves. It is by their ability to carry out these functions that living animals are distinguished from inert matter, and the boy who prods a frog to make it jump is performing a fundamental physiological experiment, since he is trying to ascertain whether the frog is alive or dead.

The simplest form of animal life consists of a single cell. This is a tiny particle of living material, semi-fluid in consistency, and called protoplasm. Part of this

Physiography (Gr. *physis*, nature; *graphein*, to describe). Science which deals with the earth and its place in nature. As a comprehensive study it is chiefly concerned with the co-ordination of the results of other sciences; from astronomy it accepts the story of the earth as a planet, from geology the account of the structure of the rocks; from meteorology and oceanography the sum of our knowledge of the air and the sea. With these fundamentals it co-ordinates the facts of physical geography, and includes some account of human activities, thus leading to the more comprehensive study of man in relation to his environment. See *College Physiography*, R. S. Tarr, 1914.

little mass of protoplasm differs from the remainder in appearance and chemical nature, and is known as the nucleus. Chemical analysis of such an organism reveals nothing in its composition which may not occur in dead matter, and it is not by its composition or even its structure, but by its power to move, nourish, and to reproduce itself, that we recognize an animal to be alive.

The problems which confront the physiologist are: How does a living animal carry out its functions? What processes take place within it, for example, when it moves in response to some stimulus? What conditions are necessary to enable the animal to carry out its functions in a normal manner? As soon as he attacks these problems the physiologist finds that living organisms possess two characteristic properties, upon the possession of which depends their ability to carry out their functions. The first is that the living animal is constantly undergoing change, and every day part of its protoplasm is destroyed and is replaced by the building up of new protoplasm. Thus the living substance of the body changes from day to day, although this result is effected imperceptibly, and the outward form of the animal does not visibly alter. The second is that the animal has the power to store up energy in its body, and to expend part of this energy from time to time; for instance, every movement on the part of an animal involves the expenditure of energy.

If, however, the animal is to renew its protoplasm and to store up energy, it must be supplied with



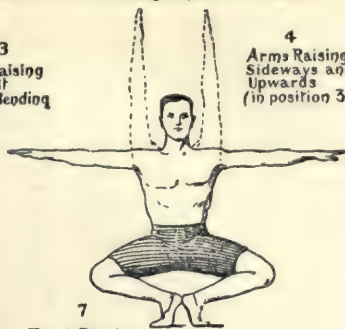
1
Position of
Attention



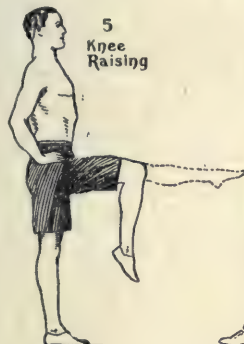
2
Action of
Chief Muscles
in position
of Attention



3
Heels Raising
and Full
Knees Bending



4
Arms Raising
Sideways and
Upwards
(in position 3)



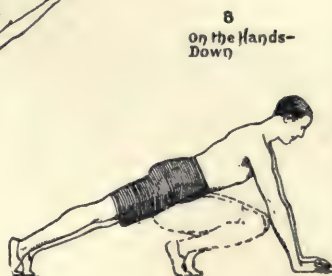
5
Knee
Raising



6
Trunk Bending
Sideways



7
Trunk Bending
Sideways
Arms - Upward
Stretch



8
On the Hands -
Down

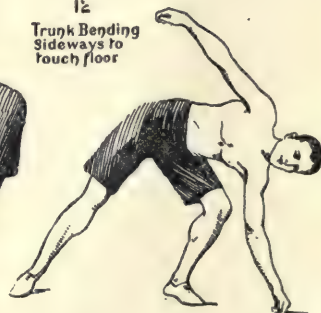


9
Left Leg -
Raise
(in position 8)



10
Left Arm Forward and Upward
Raise (in position 8)

11
Trunk Bending
Sideways to
touch floor



11
Trunk Full Downward
Bend
Upward - Stretch

13
Rabbit
Hop



14
Ears
Up



15
Kangaroo
Jump



16
Jack in
the Box



Figs. 1-12 are exercises which are similar in army training and schools under Board of Education syllabus. Figs. 13-16 are exercises for children from the syllabus. In Fig. 2 hamstring, gluteus and abdominal muscles

keep pelvis and hip joints at correct angle. Spine and shoulder carriage is controlled by dorsal muscles and erector spinae; head and chest by neck muscles; legs by thigh adductors, quadriceps and hamstrings

PHYSICAL TRAINING : EXERCISES OFFICIALLY ADOPTED IN GREAT BRITAIN

By courtesy of H.M. Stationery Office

food. This, after undergoing a preliminary process of digestion, furnishes the raw material which the living animal transmutes into living protoplasm, or can utilise as a source of the energy expended in the course of its activities. The processes involved in the building up of food into protoplasm and the breaking down of protoplasm into waste-products are included under the term Metabolism, which forms an important section of physiology, and the study of metabolism shows that not only food, but also a supply of oxygen, is necessary for the life of the organism.

In the lowest forms of animal life all the processes just described take place within the compass of a single cell. But the study of animals higher in the scale of evolution at once reveals differentiation of both structure and function, since these animals consist of many cells, which have become modified in structure and specialised as regards their function. Some cells, for example, are gathered together to form *organs*, possessing the special function of forming the digestive juices and of carrying out the digestion of the food taken into the body. Other groups of cells are transformed into muscles, and are concerned in bringing about bodily movements. Other cells, again, form organs, such as the eye.

Coordination of Activities

The development of separate organs, each having its characteristic function, implies division of labour, and this, in an animal as in a community, usually leads to greater efficiency. But, although the main function of the cells of the various organs of a highly developed animal consists in carrying out digestion, excretion, or movement, as the case may be, the cells still possess the power of building up their protoplasm, and require food and oxygen both for this purpose and for the performance of their special function. Hence the effective working of the different organs, and, indeed, of the body as a whole, depends upon co-ordination of their activities. The muscles, for instance, would quickly cease to act, if the digestive system failed to carry out its functions, or if the lungs or circulatory system failed to supply the muscles with nutritive materials and with oxygen. In this respect the body resembles a highly civilized community, whose well-being depends not only on division of labour, but also on the closest cooperation between the different sections of the community.

A further outcome of increasing complexity of structure and spe-

cialisation of function in the higher animals is that, as regards their functions, the different organs fall into two main groups. One group is primarily concerned with providing for the nutritive requirements of the body, with the supply of oxygen, and with the removal of waste-products from the body. The other group of organs is responsible for bringing about the reactions of an animal to changes in its surroundings. All the higher animals are provided with muscles, and these possess the power of altering their shape, thereby bringing about movement of part or the whole of the body; and such movements form the only means by which an animal or man can enter into communication with the outer world. Speaking is carried out by movements of muscles, all gestures are brought about by muscular movement, and running, walking, and so forth are effected by muscular movement.

Nerves and Muscles

In the normal animal, however, every muscular movement is controlled by the central nervous system, which consists of the brain and spinal cord; and these are connected with the muscles by delicate threads called nerves. Hence every movement of the body is normally dependent on, and is an indication of, the activity of the brain or spinal cord. If the nerves passing from the nervous system to any particular muscle are destroyed, that muscle becomes useless and is said to be paralysed.

It is clear, therefore, that the range and variety of the movements which an animal can carry out is proportional to the development of its muscular and nervous systems. The brain is also connected by means of nerves with the surface of the body, with the eye, and with the ear; and a ray of light falling into the eye, or an object touching the skin, causes an impulse to pass to the brain, which may respond to this stimulus by setting in action certain muscles. This sequence of events occurs, for example, when the hand is suddenly drawn away from a hot object placed in contact with it. Since the ability of an animal to respond effectively to the stimuli constantly reaching the body from without depends upon the capacity of the nervous system to bring about muscular movements, the development of its nervous system is the measure of an animal's position in the scale of evolution.

It is evident, then, that the student of physiology must proceed along three main lines of inquiry. In the first place, it is necessary

for him to discover as accurately as possible the functions of each organ of the body and the conditions under which these functions are carried out. In the second place, he is called upon to study how the animal reacts to the changes constantly taking place in its surroundings. Lastly, he must ascertain how the activities of the different organs of the body are linked together and coordinated so as to promote the highest efficiency of the body as a whole.

In the animal world structure and function go hand in hand, and observation has shown that, if a similar structure or organ is found in two types of animals, the main function of that organ will be the same in the two animals. The study of the functions of the lower animals, therefore, not only adds to the sum of knowledge, but is of supreme importance from a practical point of view, since it throws light on the functions of the human body.

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Physostigmine OR ESERINE

Substance obtained from the calabar bean (*Physostigma venenosum*) and used for various affections of the eye. See Calabar Bean.

Piacenza. Prov. of N. Italy, in Emilia. It lies S. of Milan, E. of Pavia, and W. of Parma. The surface is level in the N. and mountainous in the S. Its area is 967 sq. m. Pop. 267,000. *Pron.* Pe-achentsa.

Piacenza. City of Italy, the ancient Placentia. The capital of the prov. of the same name, it stands on the right bank of the river Po, just below the influx of the Trebbia, and is a junction 92 m. by rly. N.W. of Bologna and 36 m. W.N.W. of Parma. It contains the 13th century Palazzo Comunale, the Palazzo dei Tribunali, and degli Scotti, early Renaissance brick and terra-cotta buildings; the Palazzo Governo, with a famous sundial; the Palazzo Farnese, a huge structure begun in 1558, but unfinished and now used as a barracks; and two episcopal palaces.

The cathedral, dating from 1122-1233, has a handsome belfry. The church of S. Antonino, the original cathedral, was founded in the 4th century, restored in 903, rebuilt in 1104, and altered in 1857. The



Piacenza, Italy. The 12th century church of S. Antonino, formerly the cathedral

church of Santa Maria is decorated with mural paintings, while that of San Sisto (1499) formerly held Raphael's Sistine Madonna, now in the Dresden Gallery. The city is walled, and in the Piazza dei Cavalli, the principal square, are two equestrian statues of dukes Alessandro and Ranuccio Farnese. Manufactures include iron, brass, silk and cotton goods, hats, and pottery; printing and flour-milling are also carried on.

Colonized by Rome in 218 B.C., Placentia was captured by the Gauls in 200 B.C., and by Totila A.D. 546. In the 12th century it became a leader in the Lombard League. It has several times fallen to the French, and in the vicinity, in 1746, the Austrians gained a decisive victory over the French and Spaniards. The modern history of Piacenza has been closely connected with that of Parma, being merged into the kingdom of Italy in 1860. Pop. 40,400. *See* Parma.

Pia Mater. Middle membrane of the three which surround the brain. It is prolonged downwards to cover the spinal cord. *See* Brain.

Piana dei Greci. Town of Sicily, in the prov. of Palermo. Situated at the foot of a hill, 11 m. S.W. of Palermo, it was founded in 1488 by a party of Albanian emigrants who fled from the Turks, and whose language and customs survive. Silk and woollen goods are manufactured. Pop. 8,500.

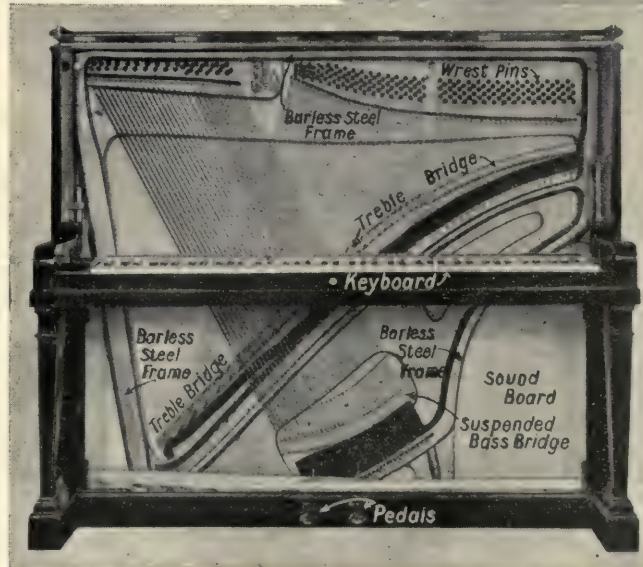
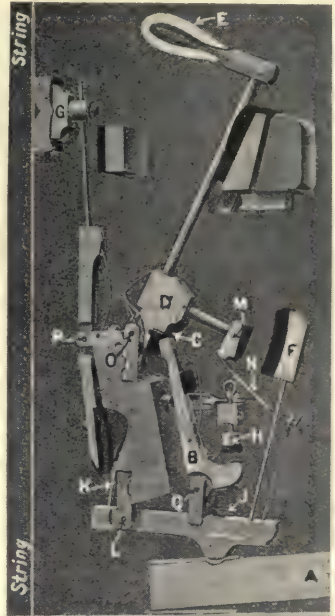
Piankhi. Name of several Ethiopian kings of Napata (*q.v.*). Piankhi I, c. 743-714 B.C., is best known by his inscribed granite stela, 5 ft. 9 ins. high, erected at Gebel Barkal, near Napata, and now in Cairo. It contains a picturesque account, in 159 lines, of his victorious expedition in a great flotilla down the Nile, which resulted in his conquest of Egypt.

Piano. Italian term used in music to indicate that the performance is to be soft. The term *pianissimo* is used for very soft. The abbreviations *p*, *pp*, and *ppp* are more commonly used than the full words. Old music has *pia.* for *piano*. *Pron.* pe-ahno.

Pianoforte (It., soft-loud). Musical instrument. The pianoforte is a percussion instrument descended from the dulcimer family. The tone is produced by the impact of felt hammers upon wires or strings of varying gauge, length, and tension. In the lowest part of the compass, for about two octaves, the required gravity is obtained by covered, or wound-round strings, one or two to each note as the case may be; above this there are three uncovered strings to each note.

The instrument is played from a keyboard composed of a recurring series of long (white) and short (black) levers or keys, seven of the former and five of the latter in each octave, the black notes being in alternate groups of twos and threes, separated by white ones. These, on being depressed by the fingers, set in motion a complicated mechanism (action) designed, not only to propel the hammers against the strings, but further to respond to the player's will, by means of his touch, in the way of graduated tone, and perfect repetition. The action is further complicated by the necessity for dampers to check undesired vibrations when the

finger releases the key. The illustration shows the mechanism of the action for treble notes. When the key A is depressed the whole carriage is moved on its centre at L. This movement is transmitted through the jack B which comes in contact with the hammer butt D at the notch C. The set and shape of this notch is the most vital part



Pianoforte. Interior of a barless frame instrument. Top, right, diagram illustrating action. A. Key. B. Jack. C. Notch. D. Hammer butt. E. Hammer head. F. Check. G. Damper. H. Set-off button. J. Jack or hopper spring. K. Spoon. L. Carriage centre. M. Check tail. N. Tape. O. Hammer butt centre. P. Damper lever centre. Q. Jack centre. See text

By courtesy of John Broadwood & Sons, Ltd.

of the action. The hammer head E is carried forward to strike the string. The set-off button H now comes into play by throwing the jack B from under the notch, thus preventing the hammer head blocking on the string. The hammer being thrown back from the string, the check tail M is caught by the check F, and so held until the key is released. In the upward movement of the carriage the spoon K comes into action by raising the damper G. The carriage and hammer butt are connected by tape N. J is the jack or hopper spring, O the hammer butt centre, P damper lever centre, Q jack centre.

There are usually two pedals; the one on the right suspends the whole damper action when pressed down. That on the left acts in one of three ways: (a) By shifting the action so that the hammers strike only two of the three strings, the unstruck one vibrating in sympathy and thus imparting a somewhat veiled but beautiful change of tone colour; (b) by moving the hammers closer to the strings so as to strike them with less force; and (c) by interposing a strip of felt between the hammers and the strings. The last two are applied to upright instruments and have little to recommend them. In certain cases a third pedal is added by which the performer can sustain a desired note or notes without affecting the right pedal.

The compass of the piano is seven octaves, from A nearly two octaves below the Bass staff to A two octaves and a third above the Treble staff. The upward compass is occasionally extended to C. Pianos are of three principal kinds, viz.: (a) grands; (b) squares; and (c) uprights, the details of the action being necessarily varied in each case. They differ in size, and are distinguished by particular names.

Although the idea of an instrument which should remedy the deficiencies of the inexpressive harpsichord seems to have been working in more than one mind at the beginning of the 18th century, the credit for priority of invention is now generally allowed to Bartolommeo Cristofori (1651-1731), a harpsichord maker of Padua and, later, of Florence. Schroeter in Germany, and Marius in France, were but little later. Subsequent makers have effected numerous improvements, but in all essentials the modern grand is simply a development of Cristofori's *Clavicembalo col piano e forte*. The light touch and small tone of the older instruments have disappeared, and there is instead a

fuller yet wonderfully responsive touch, occasioned by improved action necessary to obtain good tone from much heavier strings, with the result that a concert grand is almost organ-like in its amplitude of sound. This development of tone has proceeded on national lines, different countries having different predilections; what the Frenchman likes does not equally appeal to the German.

Although to become a concert pianist demands both talent and assiduity, it is nevertheless possible to become reasonably efficient without devoting an excessive amount of time to mastering the instrument. To the average player the piano offers the maximum of return for the minimum of outlay, enabling him to acquire a personal acquaintance with various forms of music. Small wonder is it therefore that scarce a home of comfortable pretensions but can boast the possession of a household instrument. A very large and important trade is the consequence. Piano manufacturers throughout the world turn out their instruments by the thousand, and concurrently there is a vast demand for piano music, both original and arranged. This state of things could never have been had the harpsichord retained its supremacy. Cristofori's invention, therefore, may be regarded as one of the chief factors in spreading a wider knowledge of music among the people. See Music; Organ; Player Piano; consult also A Description and History of the Pianoforte and of the Older Keyboard Stringed Instruments, A. J. Hipkins, 1896; History of the Pianoforte, O. Bie, Eng. trans. E. E. Kellett and E. W. Naylor, 1899.

Piano Organ. Mechanical musical instrument largely used by itinerant musicians. It has wires and a hammer action like that of a pianoforte, actuated by a pinned barrel of the musical box type. The tone is usually strident and unsympathetic. See Mechanical Piano; Musical Box.

Piassaba. Fibre largely used for making brushes and brooms. It is obtained from two S. American palms, of the natural order *Palmae*. The finer kind, known as *Para piassaba*, is the envelope of the young leaves of *Leopoldinia (Cocos) piassaba*, which after it has served its natural purpose hangs down and covers the trunk. The other and coarser kind comes from the leaf bases of *Attalea funifera*, whose fruits (coquilla nuts) are extensively used by the turner for making knobs and other small articles.

Piastre (It. *piastra*, plate of metal, also a coin). Name of a Turkish and an Egyptian coin



Piastre. Obverse and reverse of the Turkish coin. Actual size

The Turkish coin is silver, divided into 40 paras, and nominally worth about 2½d. It is coined in ¼, 1, 5, 10, and 20 piastre pieces. Gold pieces of 25, 50, 100, 250, and 500 piastres are also coined. The 100 piastre is called the mejidieh, or Turkish pound (£1). There are also copper piastres and sub-divisions. The Egyptian piastre is worth a little more than the Turkish, and is coined in similar denominations.

Piatra. Town of Moldavia, Rumania, chief town of the district of Neamtzu. It is about 60 m. S.W. of Jassy, and trades in timber. Pop. 18,000.

Piatti, ALFREDO CARLO (1822-1901). Italian violoncellist. Born at Bergamo, Jan. 8, 1822, the son



Alfredo Piatti, Italian violoncellist
Domeny

of a violinist, he studied at Milan. As a performer on the 'cello he appeared in many continental towns before making his début in London in 1844. In England his great gifts were immediately recognized, and from 1859-97, when he retired, he was first violoncellist at the Popular Concerts. Piatti wrote songs, chamber music, and pieces for the 'cello. He died July 18, 1901.

Piahy. State of N.E. Brazil. It is bounded W. by Maranhão, E. by Ceara and Pernambuco, and S. by Bahia. The river Parnahyba flows along its W. boundary. The surface is mostly a plain, watered by numerous rivers, and stock-raising is the principal industry. Iron, copper, silver, lead, and salt are found, but are little exploited. Cotton, sugar, tobacco, rice, rubber, and dye woods are produced, and cotton-weaving is carried on. The capital is Therezina (q.v.). The area is 116,523 sq. m. Pop. 441,350.

Piave. River of N.E. Italy. It rises in the Carnic Alps and flows in a S.E. direction to the Adriatic 22 m. N.E. of Venice, after a course of 125 m. At its present mouth is Porto di Cortellazzo: the old mouth is at Porto di Piave Vecchia, nearer Venice. *Pron.* Pe-ahvay.

PIAVE: THE THREE BATTLES OF 1917-18

Robert Machray, Writer on Foreign Affairs

Here are described three important battles between the Italians, with whom were the British, and the Austro-Germans. See the articles Caporetto; Isonzo; Vittorio Veneto; Cavan; Diaz; Plumer

The battles of the Piave were three battles fought between the Austrians and the Italians in Nov., 1917, June, 1918, and Oct.-Nov., 1918. The Italians were aided by the British and the Austrians by the Germans.

FIRST BATTLE, Nov. 12-16, 1917. After the disaster at Caporetto in Oct., 1917, the Italians retreated to the Piave and were in position on its west side on Nov. 10. The Lower Piave, from Nervesa to the sea, a length of about 25 m., formed a fair defensive front, as it was flanked on the north by the Montello and on the south by the sea marshes, but from above the Montello to its sources in the Dolomites the river, whether in its middle or upper course, presented no great natural obstacle to an enemy. On Nov. 12 the Austro-Germans crossed the Lower Piave at Zenson, but the Italians immediately counter-attacked, and pinned them up against the bank. Next day the enemy tried to force a passage at Quero and Fener, on the Middle Piave, and at San Dona and Intestadura, on the Lower, but was repulsed. An attempt to get across by the island of Grave di Papadopoli also failed, but the Italians were unable to drive in the bridgehead which the Austrians had made at Zenson.

On Nov. 16 the Austrians attacked the river line with large forces, but the defence stood firm; they crossed above the railway bridge E. of Treviso in several places, but the Italians threw them back, with a loss of 1,500 in prisoners alone, an equal number being killed. In this area the Italian third army defeated or held up all the efforts of the enemy, who here had two armies, to pierce the line of the Piave. The Austrians desisted in their attempts, and transferred the front of attack to the N. areas, nor was there much change on the Lower Piave till they lost the Zenson bridgehead in Jan., 1918.

SECOND BATTLE. In the Austrian offensive of mid-June, 1918, the main weight of the attack was felt on the line of the Piave from below the Montello to the sea. The first effort of the Austrians at forcing the river front was made early on June 15 at that part of the Piave, about 5 m. S. of Nervesa, where the island of Grave di Papadopoli lies almost

midstream, some hours before their other attempts to cross higher up or lower down. There had been a heavy bombardment of the Italian trenches with gas-shells on the previous day; and the crossing was made before dawn under cover of a smoke barrage. The Austrians had hardly gained a foothold on the W. bank of the river when they were strongly counter-attacked by the Italians, who drove most of them back to the island. Other attempts were made from Grave di Papadopoli, some of which gained a footing again on the W. bank, but all failed in the end. A short distance farther down the Austrians forced a passage between Candelu and Fagare, and once more at the Zenson bend. They brought up large forces, but so strenuous was the Italian resistance that on June 18 they had advanced only a mile from the river towards San Biagio, and on June 19 they were driven back to the positions they had taken on the first day.

The Piave in Flood

Still lower down the river the Austrians forced a crossing between Fossalta and Musile, opposite S. Dona di Piave, and progressed some little way along the railway that runs to Mestre, S. of Treviso and N.W. of Venice. South, in the region of the marshes below Musile, they pushed on as far as the Fossetta Canal. The struggle in this region fluctuated, the Austrians losing ground on the whole.

Then on June 19 the Piave poured down in flood, and the Austrians held on to the W. bank with difficulty. On June 21-22 the floods fell, and during the night of June 22 the Austrians were able to withdraw to the E. bank, losing heavily. The great offensive had issued in failure on the Piave as elsewhere. During the next fortnight the Italians improved their line in the S. by retaking the Capo Sile bridgehead, which had been lost earlier, and other positions, between the Old and the New Piave. (See *The Battle of the Piave*, June 15-23, 1918, issued by the Supreme Command of the Royal Italian Army, Eng. trans. M. Prichard-Agnetti, 1921.)

THIRD BATTLE. At the close of the struggle on the Piave in June, 1918, the Italians were solidly lined up on the W. bank of the river, and the Austrians lay on the E. side, with a forward position in the island of Grave di Papadopoli.

The attack was begun by the tenth Italian army, which consisted of the 14th British corps, under Lt.-Gen Sir J. M. Babington, and the 11th Italian corps, including the 332nd American regiment, under Gen. Paolini, the whole being commanded by Lord Cavan. The British corps was composed of the 7th division, under Major-Gen. T. H. Shoubridge, and the 23rd division, under Major-Gen. H. F. Thullier. During the night of Oct. 23-24 British troops crossed the main channel of the Piave, surprised the Austrian garrison on the island, and captured the N. half of it, the S. half being taken two nights afterwards by British and Italian forces.



Piave. Map of the battlefield showing the area recovered in the battle of Oct.-Nov., 1918

Early on Oct. 27 Italian and British infantry attacked on the line extending from above the Montello to below the Grave di Papadopoli, in the Middle Piave area.

The Italian eighth and twelfth armies simultaneously attacked N. of the Montello, crossed the Piave, and broke into the Austrian front lines on Oct. 27, and next day had captured and consolidated an extensive bridgehead over against the Montello. On Oct. 28 the Italians had gained possession of Valdobbiadene, S. Pietro di Barbozza, Farra di Soligo, Pieve di Soligo, Collalto, Refrontolo, Fontanelle, all N. of the Montello, and Mareno di Piave, somewhat E. of it, and 4 m. N. of the river. The capture of Refrontolo, N.W. of Conegliano, marked a five miles' advance. The Italians pursued the retreating enemy, and were in Conegliano on the morning of Oct. 29.

Meanwhile, the tenth army had been no less successful. At 6.45 a.m. on Oct. 27 Cavan attacked from the Grave di Papadopoli, and reached the E. bank of the Piave, gaining and consolidating a large bridgehead, and taking several villages. The attack was pressed next day, and his patrols ranged up to the Monticano. This advance materially contributed to that of the eighth army, as it weakened the hold of the enemy on the high ground about Susegana, and permitted the right wing of that army to cross the Piave at Nervesa. On Oct. 29 Cavan's whole forces were on the line of the Monticano from Fontanelle to Ramero, S.E. of Conegliano. Higher up, on the extreme left, troops of the twelfth army, fighting astride the Piave, carried the greater part of Monte Cesen, 3 m. N. of Valdobbiadene.

Crossing of the Lower Piave

About the same time the eighth army occupied the defile of Follina and reached Vittorio, seven miles N.E. of Conegliano. On that day, too, the third army, which held the front from the right of the tenth army down to the Adriatic, forced a crossing of the Lower Piave at Zenson and at S. Dona di Piave. The Austrian losses were serious, upwards of 30,000 in prisoners alone, and several hundred guns.

On Oct. 30 the Italians continued their advance in the Piave area. The twelfth army completed its conquest of the Cesen massif, and the eighth army was nearing Pordenone. Cavan had entered Oderzo, and had got to the Livenza, while Italian cavalry were advancing on the plain. The third army was fighting its way

from the Lower Piave to the Monticano, where the Austrians made a great effort to hold it, but in vain. Over the whole front they had lost 50,000 in prisoners, 12,000 of whom had been taken by the tenth army.

Next day the twelfth army was beyond Quero, and the eighth army was marching on Belluno, which was occupied on Nov. 2; the tenth army was on its way to the Tagliamento, and the third army was on the line of the Livenza. On Nov. 1-2 the Italians pressed their advance to the Tagliamento. Pordenone fell on Nov. 1; the Tagliamento was crossed by the Italians next day, and reached by the British of the tenth army on Nov. 3. In the meantime, the Austrians had been seeking an armistice, which was granted by the Allies, and at 3 p.m. on Nov. 4 operations ceased on the whole Italian front.

Piazza (Lat. *platea*, broad space). Italian word for a square or open space, surrounded by buildings. The most famous is the piazza of S. Mark at Venice. Some of these squares were surrounded by an arcade, and the word is sometimes used, therefore, for an arcaded walk. See Venice.

Piazza Armerina. City of Sicily, in the prov. of Caltanissetta. On a mountain slope, alt. 2,360 ft., 15 m. E.S.E. of Caltanissetta, it has a 16th century cathedral with a fine belfry, and remains of the Norman period. The inhabitants of Piazza, which was founded in the 11th century, still speak a Lombard dialect. There is a trade in oil, wine, and nuts. Pop. 25,000.

Piazzi, GIUSEPPE (1746-1826). Italian astronomer. Born at Ponte in the Val Tellina, July 16, 1746, he became professor of mathematics at Palermo, 1781, and established there an astronomical observatory. After publishing in 1792 a number of corrections of previous estimates of the aberration of light, the parallax of certain heavenly bodies, etc., on Jan. 1, 1801, he discovered the first asteroid (*q.v.*), Ceres. For his two catalogues of fixed stars, in 1803 and 1804, he received recognition by the French Institute. He was appointed director of the government observatory at Naples in 1817. He died July 22, 1826.

Pibcorn (Gael. *piob*, pipe; *corn*, horn) OR HORNPIPE. Ancient reed instrument mainly in use among Celtic peoples. It probably gave its name to the familiar dance now associated with sailors.

Pibroch (Gael. *piobaireachd*, art of piping). Music of the Scottish Highlands, suitable for the

bagpipes. In form it is of the variation type, an air being given out and then varied by ornamental treatment of all kinds. The variations usually increase in elaboration, sometimes alternating with a slow version. Many pibrochs bear the names of famous pipers or their chieftains, or of legendary stories or events of history. See Bagpipe. *Pron.* pee-brokh.

Pica. Printing type. Also known as 12-point, it is a size larger than small pica, a size smaller than English, and the largest ordinary size of book type; six lines make an inch in depth.

(This line is in pica)

Used as a standard unit of measurement, and also for the point system, it is called *Le Cicéro* in French and *Cicero* in German, the Epistles of the Latin writer of that name having been first printed in type of this size. The Dutch call it *Mediaan*. See Printing.

Picardy. One of the provs. into which France was divided before the Revolution. It lay between Normandy, Île de France, Champagne, Hainault, and Artois, and had a frontier on the English Channel. Through it ran the rivers Somme and Oise, and it was divided into N. Picardy and S. Picardy. In it were the cities of Amiens, Laon, Beauvais, Senlis, Soissons and Noyon; also Boulogne and St. Quentin. The name Picardy appeared about 1300, but much earlier the district had been a possession of the kings of France. Part of it was handed over to the duke of Burgundy in 1435, but this was recovered by the French king in 1477. It was long a very prosperous district—a French East Anglia, while the Picard also had a reputation as a fighting man. To-day Picardy is represented by the departments of Somme, and parts of those of Pas-de-Calais, Aisne, and Oise, in all of which much fighting took place in the Great War. See Amiens.

Picaresque Novel. Type of story dealing with the lives and doings of rogues and adventurers. The adjective is derived from the Spanish word *picaron*, Eng. *picaroon*, a cheat, an adventurer, or one who lives by his wits. Due to reaction against the degenerate romance of chivalry, the type originated about 1550 with the anonymous Spanish Life of Lazarillo de Tormes, the realistic description of the career of a young beggar. It was followed by M. Alemán's Guzmán de Alfarache, 1599, and by many similar novels in Spain and other countries.

Typical examples are Le Sage's Gil Blas, Fielding's Jonathan Wild, and Thackeray's Barry Lyndon.

Picayune (prob. Fr. *picailon*, a small coin). Name used in Florida and Louisiana for the Spanish half-real, and now for the U.S. 5-cent piece.

Piccadilly. London thoroughfare. It extends W. from Coventry Street and Piccadilly Circus to Hyde Park Corner. One of the most fashionable parts of the metropolis, and with a history going back to the early part of the 17th century, it contains the Piccadilly and Ritz hotels, Princes' Hall restaurant, façade of the Geological Museum, Burlington House (*q.v.*), Burlington Arcade, and many clubs. Some of the fine houses for which it was famous still front the Green Park. Devonshire House was being dismantled in 1921, but Apsley House (*q.v.*) remains, as does The Albany, designed for Lord Melbourne and

trimmings and collars known as peccadils or peckadila. The name Piccadilly is given to a thoroughfare connecting Market Street and London Road, Manchester. See London; consult also Round About Piccadilly and Pall Mall, H. B. Wheatley, 1870; Piccadilly, Laurence Oliphant, 1870; The Ghosts of Piccadilly, G. S. Street, 1907; Wanderings in Piccadilly, Mayfair, and Pall Mall, E. B. Chancellor, 1908; Piccadilly in Three Centuries, A. I. Dasent, 1920.

Piccolo. Italian word meaning small, most commonly applied to the little flute which sounds an octave higher than the concert flute. Some piccolos are made a semitone, or a tone and a half, higher than the ordinary piccolo, with open scales sounding E flat and F respectively. The piccolo is much used in light orchestral music, but in orchestral scores of the higher types it is reserved for special effects. The compass of the piccolo is similar to that of the flute, but all sounding an octave higher than the flute of the same nominal pitch. The piccolo, however, does not possess the lowest two semitones (C and C sharp), and reaches the extreme upper notes only with shrillness and difficulty. See Flute.



Piccadilly Circus, London. Looking N.W. towards Regent Street Quadrant

since 1804 devoted to residential chambers, in which Byron, Macaulay, "Monk" Lewis, Canning, Bulwer Lytton, and Gladstone once resided. In St. James's Church, built by Wren in 1682-84, Charles Cotton, Tom D'Urfey, and Mark Akenside are buried. The 4th duke of Queensberry, known as "Old Q," lived at No. 138.

St. James's Hall, once the home of the Moore and Burgess Minstrels, stood on the site of the Piccadilly Hotel. Piccadilly Circus is crossed by Regent Street, while Shaftesbury Avenue, Coventry Street, and Glasshouse Street lead from it. It contains the Criterion Theatre and Restaurant, and the London Pavilion, and in the centre is a fountain by Alfred Gilbert, erected in 1893 to the memory of the 7th earl of Shaftesbury. Piccadilly derives its name from a house built by a retired tailor on the N.W. corner of the Haymarket, and called Piccadilly Hall because its owner had made foppish doublet

Italian family. Settling in Siena in the early 13th century, its members established commercial houses in Italy, France, and Germany, and amassed great wealth. Belonging to the Guelph faction, they were alternately in exile and in power, but eventually lost their influence and declined in prosperity. The family produced several important personages, including two popes, Aeneas Silvius, Pius II (*q.v.*), and Francesco, Pius III (1439-1503). Alessandro Piccolomini (1508-78), archbishop of Patras, was a philosopher.

Piccolomini, MARIETTA (1836-99). Italian opera singer. Born in Siena, a member of a noble Tuscan family and a pupil of Pietro Romani, she made a successful début at Florence, in Lucrezia Borgia, 1852, and repeated this success in Rome, Pisa, Bologna, Palermo, Verona, and Turin. Her first appearance in London was at Her Majesty's Theatre, 1856, in La Traviata, and she met also with



M. Piccolomini, Italian singer

the stage in 1860, and died at Florence, Dec., 1899.

Piccolomini, OTTAVIO (1599-1656). Italian soldier. Born in Florence, Nov. 11, 1599, he belonged to the noble family of which Pius II was a member. He began his military career in the army of Spain, but in 1618, on the outbreak of the Thirty Years' War, was with a force sent to fight on the emperor's side. He had a full and varied career both as diplomatist and soldier before he joined Wallenstein, and, having fought at Lützen, he rose to be a general officer, and shared in the plot that resulted in the murder of his leader. In 1635, having in 1634 helped to win the battle of Nördlingen, he went to aid the Spaniards in the Netherlands, and he remained in high command until the end of the war in 1648, being in its concluding months the imperial generalissimo. He was made duke of Amalfi and a prince. He died Aug. 11, 1656. Piccolomini figures in Schiller's Wallenstein.



Ottavio Piccolomini, Italian soldier

Pice. Indian copper coin. Four equal one anna (*q.v.*), and its value is a farthing. It is divided into three pice.

Picene. White hydrocarbon with a blue fluorescence obtained from the residues from the rectification of Californian petroleum, and also found in the pitch remaining when coal-tar is distilled. The boiling point is 518° to 520° C., the highest of that of any known hydrocarbon.

Picenum. Country of ancient Italy. Lying on the Adriatic, it was bounded N. by Umbria, W. by Umbria and the Sabine country, and S. by the country of the Vestini. The inhabitants of Picenum submitted to Roman rule towards the middle of the third century B.C., but revolted in the Social War, 90 B.C., their town of Asculum being made the capital of the league. After the war they secured the Roman franchise.

Pichegru, CHARLES (1761–1804). French soldier. He was born at Arbois, Feb. 16, 1761, and educated



Charles Pichegru,
French soldier

at the military academy of Brienne, to which he subsequently returned as a teacher, among his pupils being Napoleon. In 1793 he became a divisional general in the Revolutionary army, and in the next two years acquired a great military reputation by his series of victories over the Austrians and their allies. In 1795, however, he began a series of intrigues with the Bourbons, which led eventually to his deportation to the penal colony of Cayenne. Escaping to England, in 1798 he resumed his intrigues, and, with Cadoudal as ringleader, a plot was hatched for the assassination of Napoleon. Cadoudal and Pichegru made a secret visit to Paris, but Pichegru was betrayed and arrested, and on April 15, 1804, was found strangled in his bed.

Pichincha. Prov. and volcano of N. Ecuador. The prov. is S. of Imbabura, E. of Manabi, and N. of Leon. It has many fertile valleys, but is subject to earthquakes. The capital is Quito. Pop. 205,000. The volcano is 8 m. N.W. of Quito, and has an alt. of 15,919 ft., with a crater 2,500 ft. deep. On its slopes was fought, May 22, 1822, the battle which secured the independence of Ecuador.

Pichon, STEPHEN JEAN MARIE (b. 1857). French statesman. Born Aug. 10, 1857, at Arnay-le-Duc, in the Côte d'Or department, he came to Paris in 1878 and was on the staff of Clemenceau's paper *La Justice*, 1880–93. In 1885 he entered the Chamber of



Stephen Pichon,
French statesman

Deputies, of which he was secretary, 1889–90. He was then successively minister plenipotentiary at Port au Prince, San Domingo, Rio de Janeiro, and Peking, 1897–1901, before being resident-general in Tunis, 1901–5. During the Boxer troubles he acted as plenipotentiary in the negotiations between the powers and China after the allied troops had entered Peking. On Jan. 7, 1906, he was elected senator for the Jura department, and in Oct. became minister of

foreign affairs in Clemenceau's first cabinet. He held the same office in the second Clemenceau cabinet, Nov. 16, 1917–Jan., 1920. Pichon participated in the conference at Versailles and in the deliberations of the Peace Conference. After the resignation of the Clemenceau cabinet in 1920, he resumed the political editorship of *Le Petit Journal*.

Pickering. Urban dist. and market town of Yorkshire (N.R.). It is 32 m. from York, with a station on the N.E. Rly., on which line it is a junction. The chief building is the church of S. Peter, which contains some old mural paintings discovered in 1851, and restored; a Norman font, and some other Norman work. There are ruins of a castle, which existed



Pickering, Yorkshire. Market place and spire of the parish church of S. Peter

before the Norman Conquest and was afterwards in the duchy of Lancaster. The chief industry is the manufacture of agricultural implements, and there is a trade in agricultural produce. The vale of Pickering lies between the moors of N. Yorkshire and the Wolds. Market day, Mon. Pop. 3,700.

Pickering, EDWARD CHARLES (1846–1919). American astronomer. Born at Boston, July 19, 1846, he was educated at the Lawrence Scientific School, Harvard. He became Thayer professor of physics, 1867–76, at the Massachusetts Institute of Technology, and professor of astronomy and director of the observatory at Harvard, 1876, a post he held to his death. In 1906 he became president of the Astronomical and Astrophysical Society of America. He died Feb. 3, 1919. Pickering made a special study of the light and spectra of stars, in connexion with which he invented the meridian photometer. Most of his results were published in the *Annals of the Harvard Observatory*. He was honoured by foreign universities and awarded gold medals by the Royal Astronomical Society.

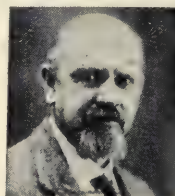
Pickering, PERCIVAL SPENCER UMFREVILLE (b. 1858). British horticulturist. Educated at Eton and

Balliol College, Oxford, graduating with 1st class honours in science, 1880, he turned his attention to agricultural chemistry, and became director of the Woburn Experimental Fruit Farm. In 1890 he was elected F.R.S. He published many papers on his subject, and among other works edited the *Memoirs of Anna Maria Pickering*, his mother.

Pickering, WILLIAM (1796–1854). British publisher. Born April 2, 1796, he began business in Lincoln's Inn Fields, 1820, and removed to Chancery Lane in 1824. He adopted the trade mark of the Aldine Press (*q.v.*), and issued a series called *The Diamond Classics* and the Aldine edition of the English poets. He died at Turnham Green, April 27, 1854. The business was

continued by his son, Basil Montagu Pickering (1836–78).

Pickering, WILLIAM HENRY (b. 1858). American astronomer. Born in Boston, brother of E. C.



Pickering, he became assistant instructor of physics at the Massachusetts Institute of Technology, 1880–87, and was appointed assistant professor of astronomy at Harvard, 1887. Pickering became famous from discoveries of the ninth and tenth satellites of Saturn, and in 1921 put forward the theory that there is vegetable life on the moon. He was awarded the Janssen medal in 1909.

Picket. Military term signifying a small detachment of troops used as an outpost or guard. Pickets are usually entrenched, and the picket line is frequently made the line of resistance in case of attack. A picket may also mean a body of troops detailed for certain special eventual duties—the fire-picket being the men instructed to take immediate action in case of an



Percival Pickering,
British horticulturist

Russell

outbreak of fire. Picket is also used in military technology to indicate the stakes or pegs used for a variety of purposes in military engineering.

Picket Boat. Small boat, usually a steam pinnace, carried by warships. *See Boat.*

Picketing. Term derived from the military word picket, and used in industrialism in a cognate sense. It describes the practice, common during strikes, of placing men near the affected works, to restrain the hands from working, or to obtain information bearing on the dispute. In 1875, by the Conspiracy and Protection of Property Act, picketing, in the sense of bringing compulsion to bear upon other workers, was declared illegal in the United Kingdom.

The practical interpretation of the distinction led to a good deal of litigation. The Trades Disputes Act of 1906 widened the area of lawful picketing, by declaring it legal, even if for the purpose of peacefully persuading any person to work or to abstain from working. *See Osborne Judgement; Strikes; Trade Unions.*

Pickford, MARY (b. 1893). American cinematograph actress. Born April 8, 1893, she appeared on the stage as a child, but met with greater success in connexion with the films. In 1920 she married as her second husband Douglas Fairbanks (q.v.).



Mary Pickford, American film-actress, as Amanda in "Suds." Top, in private life

Picking. Term applied in metallurgy and mining to one of the preliminary processes by which worthless gangue is separated from valuable ore. The operation consists simply in turning over the mass of crude ore, breaking the larger pieces, which is in many cases done by hand, examining carefully the pieces, and picking out and throwing aside those which are obviously of no value. The picking may be performed on the mass in the open, as in many metalliferous mines, or it may be performed at the side of a travelling band which carries the crude material along past the pickers, as is done at many modern collieries. *See Coal; Ores; Mining.*

Pickles (Dutch *pekel*, brine). Articles of food preserved in brine or vinegar. Pickled vegetables and pickled meats formed an important part of the diet of our ancestors, when meat was killed at Michaelmas for the winter and winter vegetables were few. Dry salting in barrels is extensively practised in Holland and Belgium, but not to a large extent in England. Another method is by pickling in strong brine.

Certain kinds of pickles used as appetisers are prepared in a solution of salt or brine, especially olives, capers, and walnuts. Sauerkraut is made by steeping finely shredded white cabbage in a solution of this kind. Other pickles are made by pouring boiling vinegar over the vegetable used, and allowing it to simmer for a short time. Cucumbers, gherkins, green tomatoes, onions, small peppers, beets, and cauliflower are prepared in this way. Various seasonings, salt, sugar, spices, and occasionally mustard are added to the vinegar. Most pickles require to be kept for a short time before using.

Pickle the Spy. Name popularly given to Alestair Ruadh Macdonnell of Glengarry (c. 1725-61) the Jacobite. *See Macdonnell, Alestair;* consult also *Pickle the Spy, 1897, and Companions of Pickle, 1898, Andrew Lang.*

Pickthall, MARMADUKE WILLIAM (b. 1875). British author. Born April 7, 1875, he was educated at



M. W. Pickthall, British author
Elliott & Fry

Harrow, and spent some years in travelling throughout the Near East, acquiring a close knowledge of native life and languages in Egypt, Turkey, and Syria,

ably displayed in his novels and other writings. These include *Said the Fisherman, 1903; The House of Islam, 1906; The Children of the Nile, 1908; With the Turk in War Time, 1914; Knights of Araby, 1917; Oriental Encounters, 1918; Sir Limpidus, 1919, a satirical novel; and The Early Hours, 1921.* He edited J. E. Hanauer's *Folklore of the Holy Land, 1907.*

Pickwick, SAMUEL. Central character in Charles Dickens's *Pickwick Papers*. The founder of the *Pickwick Club*, Mr. Pickwick also appears in *Master Humphrey's Clock (q.v.)*. *See Bardell, Mrs.; Phiz.*

Pickwick Papers, THE. Charles Dickens's first novel, issued under the title of *The Posthumous Papers of the Pickwick Club*, in monthly parts, April, 1836-Nov., 1837. It originated in Chapman and Hall's suggestion that Dickens should provide letterpress for a series of sporting pictures by



Mr. Pickwick addressing the club before starting on his adventures. On his right is seated Tupman, on his left are Snodgrass and Winkle. From the etching by Seymour, in the first edition of *The Pickwick Papers*

Robert Seymour setting forth the adventures of a Nimrod Club. The work introduces between 300 and 400 characters, including Pickwick; Mrs. Bardell; Sam Weller, one of the supreme successes of fiction; his father Tony; Alfred Jingle, the troling player; Joe the Fat Boy; Bob Sawyer, the medical student; Stiggins, the unspeakable "shepherd"; Mrs. Leo Hunter, and many others. Thackeray and Leech offered to illustrate the story, but the original drawings are by Seymour (seven), R. W. Buss (two), and Phiz (34). In James Albergy's play, *Pickwick*, Sir Henry Irving found one of his most popular characters, Jingle (*q.v.*).

Pico. Island of the Azores, midway between Flores and St. Michael's. It culminates in the volcanic height, Gran Pico, 7,613 ft. Much of the surface is covered with lava. The chief product is wine. San Antonio and Lagens do Pico are the chief towns. Its area is 176 sq. m. Pop. 15,000.

Pico DELLA MIRANDOLA, GIOVANNI (1463-94). Full name of the 15th century Italian humanist, Mirandola (*q.v.*).

Picón, JACINTO OCTAVIO (b. 1853). Spanish novelist and critic. Born in Madrid, Picón established his reputation as a novelist by his *Lazaro*, 1883, an able study of ecclesiastical problems which aroused keen controversy. Other works of fiction, marked by independence of outlook and shrewd psychology, are *La Hijastra del Amor*, 1884; *El Enemigo*, 1887; *Dulce y Sabrosa*, 1891; and *Cuentos di mi Tiempo*, 1895. He is also a distinguished critic, having published several volumes of artistic and dramatic criticism, notably on Velazquez, 1899. His collected works appeared in 1909, and he is librarian of the Real Academia Española.

Picotée (Fr., marked). Horticultural term for a show class of carnations, in which the petals of the flower are edged with a colour contrasting with the ground tint. They are further distinguished as "heavy" and "light" according to the breadth of the edging, which may be in yellow, rose, purple, or red. See *Carnation*.

Picotite. In mineralogy, one of the spinel group of minerals. It is a chrome-spinel containing manganese, aluminium, iron, and chromium, and is found in black grains and crystals in serpentine and olivine rocks. See *Spinel*.

Picquart, MARIE GEORGES (1854-1914). French soldier. Born at Strasbourg, Sept. 6, 1854, he entered the army from St. Cyr, and served in Algeria and the East, becoming a staff officer at home in



M. G. Picquart,
French soldier

1894. His duties led him to suspect the genuineness of the Esterhazy bordereau in the Dreyfus case. He was sent abroad, but returned, 1898, and gave important evidence then and at the Rennes trial, in spite of bitter professional hostility. General in 1906, he was minister of war under Clemenceau, 1906-9, and then was made commander of an army corps. He died at Amiens, Jan. 19, 1914, and received a public funeral in Paris on the grounds of his services to the state in the Dreyfus affair.

Picric acid OR TRINITRO-PHENOL. Bright yellow crystalline powder obtained by the action of nitric acid on phenol or carbolic acid. Picric acid is a powerful antiseptic, but its chief use is in the manufacture of explosives. See *Lyddite*; *Melinite*; *T.N.T.*

Picrite (Gr. *pikros*, bitter). Crystalline igneous rock of the ultrabasic group of rocks. Its chief constituents are olivine and augite, but it usually contains hornblende, biotite, etc., in varying quantities. Usually dark green to black in colour, the rocks are very similar to peridotites in composition, and are found in Great Britain, Germany, Silesia, N. America, etc. See *Peridotite*.

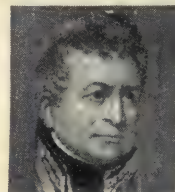
Pictography OR PICTURE-WRITING (Lat. *pictus*, painted; Gr. *graphein*, to write). Representation of facts and ideas by means of pictorial symbols. The earliest form of self-explanatory record devised by man, it sprang from the primeval arts of design. In palaeolithic Europe naturalistic paintings on cave-walls became conventional, and during the Azilian period pictorial symbolism emerged as an aid to memory and a method of communication. Neolithic Egypt and W. Asia carried to further lengths this effort of the mind. In the early metal age pictographic symbols passed into ideograms, each definitely related to spoken phrase or word. Hereupon the independent designer became the scribe, and had to learn to read and write a recognized system; school-exercises in early Sumerian and Egyptian pictographs are extant. These symbols were destined, in Babylonia, Egypt, the Aegean, and China, to develop into syllabic and alphabetic writing.

The primitive pictography of the pre-metallic age drifted with early

migrations to other parts of the world. In neolithic India it was practised by Vindhya hill cave-dwellers, and is still traceable in Melanesia. At the continental extremities it survives among Bushmen, Veddas, and Australian aborigines. Eskimo bone-engravings, which resemble prehistoric hunting scenes, depict not only concrete objects, but also actions and relations. The symbols are more or less self-explanatory, but are transposed into speech in phrases varying with each interpreter. This form of pictography, conveniently called picture-writing, was highly developed among the N. American plains Indians, while some Brazilian tribes still inscribe pictorial diaries upon dried calabashes. In pre-Columbian America the Maya and Aztec peoples developed pictographic scripts of true ideographic form, and prepared pictorial codices of considerable skill. This achievement may have had behind it some cultural impulse, more or less remote, derived from the Old World systems. They do not appear to have passed beyond the stage of rebus-writing, for proper names.

Pictographs are often employed in modern Europe for the sake of emphasis, as when arrows or pointing hands appear on sign-posts to indicate direction. See *Alphabet*; *Aztec*; *Cuneiform*; *Hieroglyphs*; *Maya*; consult also *Picture-writing of American Indians*, G. Mallory, 1893; *The Races of Man*, J. Deniker, 1900.

Pickton, SIR THOMAS (1758-1815). British soldier. Born at Poyston, Pembrokeshire, he entered the army



After Seechey

in 1771, but retired on half-pay, 1783. Returning to the service, 1794, he took part in the capture of St. Lucia, 1795, and became governor of Trinidad, 1797. Resigning in 1803, he was acquitted after trial of charges of using torture. Major-general, 1808, Pickton accompanied the Walcheren expedition, 1809; he went to the Peninsula, 1810, and took prominent part in the fighting at Fuentes d'Onoro, Torres Vedras, Badajoz, Vittoria, and elsewhere. He was killed at Waterloo, when leading a charge, June 18, 1815.

Pickton Castle. Residence of Sir Charles E. G. Phillips. It is 3 m. from Haverfordwest, Pembrokeshire, Wales. A fortified residence

in the time of William Rufus, it owes its name to William de Picton, a Norman knight, and passed in the 16th century to Thomas ap Philip, whose descendant, Sir Richard Phillips, defended it on behalf of Charles I.

Pictou. Seaport of Nova Scotia, Canada. It stands on a harbour, an inlet of Northumberland Strait, 118 m. by rly. from Halifax. The manufactures include shipbuilding, and coal is exported. Pop. 3,200.

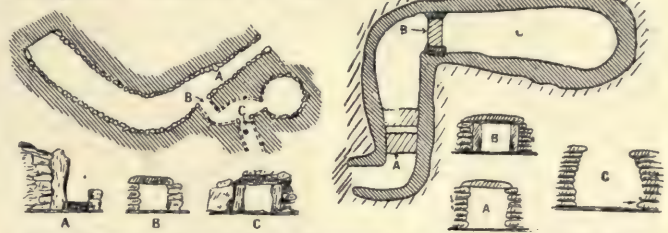
Picts. Name of a people formerly inhabiting northern Scotland. Divided into two nations, the Northern Picts, or Dicaledonae, inhabited the country between the Pentland Firth and the Grampians; the Southern Picts, Vecturiones or Verturiones, that between the Grampians and the Firth of Forth. The Verturiones represent the Brythons inhabiting the kingdom of Fortrenn.

From the 3rd century A.D. the Picts are recorded as resolute and harassing foes of the Roman occupation, allied sometimes with the Scots, the N. Irish race who peopled Argyll and Kintyre, and they were never definitely subdued by the Romans. S. Ninian and S. Columba were among the missionaries who worked to convert the Picts. Oswald of Northumbria held temporary sway over Pictland in the 7th century, and there were constant wars with the Scots and with the Dalriadic kingdom during the 8th century. The peculiar system of royal succession, by which the rule passed to brothers or the son of a sister, led to much confusion, which ended with the establishment of Kenneth MacAlpin, the Scottish chief from Kintyre, but a Pict by maternal descent, as ruler of Scots and Picts together in 844.

Picti, the name used by Latin writers, probably identical with that of the Pictones or Pictavi of Poitou, is held to be a Brythonic (Welsh) designation for this people, who, in fact, called themselves the Cruithni or Cruithnig. There has been much complicated controversy as to who the Picts were, and what their racial stock and language. Skene maintained that names of early Pictish kings were purely Gaelic, though later ones showed a Brythonic origin, but of Cornish and not Welsh dialect; and it is known that the Damnoni settled both in Cornwall and in Fortrenn (Menteith and the Mearns). Sir John Rhys contended that the Picts were non-Aryan, as their custom of matriarchy (*q.v.*) indicates, and brought forward evidence to show that the extant Pictish place-names are of Brythonic and not Gaelic origin.

Cruithni means pictured or figured, and the habit of painting the body with figures of birds and beasts was probably widespread. The word Cruithni may well be identified with Brython, Brittones, and Britannia, the Welsh name for Pict being Prydyn. But the question is still obscure, although the old view of the Teutonic (Gothic) stock of the Picts, fostered by Pinkerton and Sir Walter Scott, is abandoned. See Gaelic; Scotland: History; consult also *Chronicles of the Picts*, 1867; *Celtic Scotland*, 3 vols., 1876-80, W. F. Skene; *Celtic Researches*, E. W. B. Nicholson, 1904; *Celtic Britain*, J. Rhys, 4th ed. 1908.

Picts' Houses. Name in popular use in Scotland for primitive underground structures of the



Picts' Houses. Ground plans and sections of earth-houses. Left, Cairn Conan, Forfarshire; right, near Broomhouse, Berwickshire. In both cases the letters against the sections indicate their positions on the plans

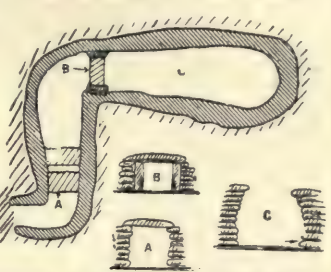
By courtesy of William Blackwood & Sons

early metallic age. Their erection is attributed to the Picts, although they may be of earlier date, and the theory is that they were used as refuges in times of danger. There are several in the Orkneys, but the greatest number are in the western part of Aberdeenshire. They are also found in Forfarshire and other counties N. of the Tay, while there are a few in Berwickshire and other southern counties. See Earth-house; Mousa.

Picture (Lat. *pingere*, to paint). Originally a representation of anything produced by painting. It is now used in a somewhat wider sense, including a representation produced in other ways, a mind picture and a word picture, for instance. The pictures is a popular synonym for the cinematograph.

Up to the 19th century picture restoration in the modern sense was unknown. Pictures, before glazing came into common use, were protected by a coating of transparent varnish, and this in time became so encrusted with dust as to be no longer transparent. The first step in restoration is to dissolve this varnish with a wash of vinegar, brandy, or other alcoholic liquid, tempered with oil applied by a separate sponge or pad, to prevent harmful action on the colours. Mastic varnish

can be removed by resin and friction with the fingers, but copal requires the liquid treatment. Where the wood, canvas, or plaster ground of a painting is seriously damaged, it may be necessary to transfer the latter to a new ground. This is effected by glueing a paper plaque, backed with gauze, to the surface of the painting, removing the wood, etc., by means of instruments or chemicals until only the surface of colour and priming remains, and remounting the latter on fresh material; the paper being afterwards unglued. A painting so transferred generally requires retouching with dry colour. Great skill and knowledge are demanded of the restorer at every stage of



the process, or considerable damage may be done. See Art; Cinematography; Painting.

Picture Palace. Hall or theatre used for the exhibition of cinematograph films. Buildings so used are licensed by local authorities, and conditions are laid down regulating their structure, so that fire risks may be reduced to a minimum. Most picture palaces in Great Britain are in private hands, fewer being owned by film manufacturing companies than in other countries. There are upwards of 4,000 picture palaces in Great Britain. Many of them are buildings erected expressly for the purpose, but a number of theatres and other existing buildings have been adapted for showing films. See Cinematography.

Picture Post Card. Card sent through the post bearing a printed or photographic picture. The picture may be a view, a portrait, a scene, a figure, a humorous drawing, or a reproduction of a painting. The first pictorial card, officially issued, was that sold at the Royal Naval Exhibition, London, July, 1891, having on it an outline sketch of Eddystone lighthouse. The first commercial cards were sold in 1894 on the summit of Snowdon, a small photograph of which was pasted on them; but these had to bear a

penny stamp. In 1895 view cards were published in Great Britain. A great impetus was given to illustrated post cards when, in 1898, the official size was increased to 5½ by 3½ ins. In 1904 the left-hand side of the front of post cards was allowed for illustration, hitherto confined to the back.

Among British states officially issuing pictorial post cards are New Zealand, Queensland, Tasmania, Natal, and Victoria. Many foreign states issue view cards, notably Greece, which, in 1902, made them a state monopoly. During the S. African War various official and semi-official picture cards were issued in S. Africa, the Mafeking siege post cards afterwards fetching 7s. 6d. each. The earliest known French post cards were published during the war of 1870-71 for the use of soldiers at Conlie camp, and later for sailors. These bore engravings of arms, national emblems, and patriotic legends.

Hotels and rly. companies early utilised picture post cards for advertisement purposes. Picture post cards are now used for advertisement and propaganda purposes, as also by philanthropic societies, political and other institutions, and for exhibitions, etc. The oldest officially issued picture post cards in America were a set of 12 published in 1893 to popularise the great exhibition at Chicago.

The exchanging and collecting of picture post cards attained extraordinary popularity in the first decade of the 20th century, and gave rise to the manufacture of albums, cabinets, frames, etc. A literature sprang up to minister to the craze, monthly magazines dealing with it being published in various countries. The chief organ of the cult was *The Picture Post Card and Collector's Chronicle*,

published in London, Jan., 1900-8. The raising of the rate for post cards in the U.K. from ½d. to 1d. in 1918, and in 1921 from 1d. to 1½d., however, did serious damage to the trade, though they could still be sent for 1d. if only five words of greeting were written.

The illustrations on post cards are reproduced by practically every process, including wood-engraving, steel and copper plates, chromolithography, colotype, the three-colour and ordinary process block and line blocks, photogravure and photography. Mechanical and musical cards with gramophone records pasted on them, multiple view, "talking," and other eccentric cards are or have been made. There are also stereoscopic cards and life-insurance-carrying post cards.

Pidgin-English. Medium of communication in Chinese ports between English-speaking people and the natives. It is sometimes used as a sort of lingua franca even by natives themselves from different districts. Pidgin is a corruption of "business." It is a jargon composed chiefly of English words, although containing an admixture of Chinese, Malay, and Portuguese, corrupted in pronunciation and arranged according to the Chinese idiom. The name is given to similar jargons in other parts of the world.

Piecework. In industry, a system of payment of workers by the piece or job instead of by time. In theory the system is recommended as tending to increase output by providing the worker an incentive to quicker production, and also as furnishing employment for a large number of outworkers. In practice it is open to objections, chiefly in the direction of exploitation of labour, which have led to the im-

position by trade unions of restrictions on its use, and to the inclusion in factory and workshop legislation of clauses protecting pieceworkers in the textile and other trades, especially by requiring employers to furnish pieceworkers with sufficient particulars to enable them to ascertain the rate of wages at which they are entitled to be paid. See *Outworker*.

Piedmont (Ital. *Piemonte*, foot of the mountain). Compartimento of N.W. Italy. It is bounded N. by Switzerland, W. by France, S. by Liguria, and E. by Lombardy. It embraces the provs. of Alessandria, Cuneo, Novara, and Turin. Mountainous on all its borders but the E., the remainder is a fertile plain. In the N. and N.W. are the Pennine and Lepontine Alps, in the W. the Graian and the Cottian Alps, and in the S. the Apennines and the Maritime Alps. The beautiful Lago Maggiore lies on its E. border. Piedmont is watered by the Po and its tributaries. The chief products are rice, maize, wheat, wine, olives, chestnuts, truffles, hemp, and silk. Silver, lead, coal, copper, and salt are mined and exported. Its area is 11,331 sq. m.

In Roman times a part of Gallia Transpadana and Liguria, it was successively a part of the Ostrogothic, Lombard, and Frankish kingdoms, and in the 11th century was mostly acquired by Savoy, of which it became the most important part, Turin being the capital of the dukes. In 1718 the dukes became kings of Sardinia, their realm comprising that island, Piedmont, and Savoy, and this title was retained until Victor Emmanuel II became king of Italy in 1861.

Piedmontite. In mineralogy, name given to a variety of epidote. A manganese epidote, found in Piedmont, Italy, Japan, etc., it is reddish black in colour, and is sometimes used as a gem stone.

Pied Piper of Hamelin, THE. Poem by Robert Browning. Written for a child friend, Willie Macready, and published in *Dramatic Lyrics*, 1842, it is based on the old legend of a Rattenfänger or rat-catcher named Bunting, who, employed to rid the town of Hameln from rats, and denied the promised reward, enticed, by his piping, all the children of the town into a mountain cavern, which instantly closed upon them. There are several variations of the story, e.g. those of the Fiddler of Brandenburg and the Hermit of Loreh, and it appears in the folklore of China and Persia. See *Hameln*; consult also *Curious Myths of the Middle Ages*, S. Baring-Gould, 2nd series, 1868.



The Pied Piper of Hamelin. An artist's impression of one of the scenes described in Browning's poem

From the painting by George J. Pinwell

Piedras Negras. Town of Mexico, in the state of Coahuila, formerly known as Ciudad Porfirio Diaz. It stands on the Rio Grande, at the S.W. end of the international bridge over this river, and is served by the International Rly. The surrounding district has cattle-breeding, agricultural, and fruit-

Steel and iron piers consist of columns, pillars, or stanchions resting upon masonry or piled foundations, sometimes braced together and joined at the top by a girder upon which the bridge superstructure bears; high braced piers are known as steel trestles. Masonry piers are of concrete, brick, granite,

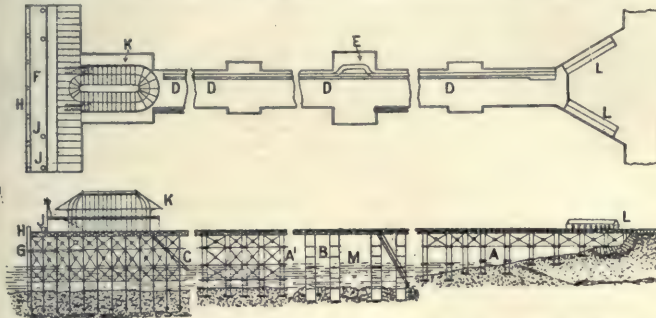
In piers of reinforced concrete the superstructure and piles are of reinforced concrete, the girders and piles being built solid with each other. Along that portion of a pier where ships berth, fendering is provided, consisting either of timber piles or of spring beams, which resist the impact of vessels. Mooring pawls or bollards are provided.

The length of a pier depends upon the distance from the shore to a sufficient depth of water for vessels to moor alongside, and the length of berthing accommodation required. In some cases the outer end is enlarged or extended at an angle, as in the case of the rly. pier at Port Limon (Costa Rica), or in the form of a tee head, e.g. the rly. pier at Bahia Blanca (Argentina), which supports very large grain storage bins and elevators. Types of promenade piers may be seen at almost every popular seaside resort. Southend pier in Essex is an exceptionally long pier for both rail and passenger traffic. Piers for goods traffic are equipped with cranes, conveyers, and other tackle. Piers serve much the same purpose as docks, and are sometimes constructed to serve as landing stages within a large dock. They can be rapidly erected, but owing to their exposed position afford no shelter to vessels, and are themselves liable to damage by storms and collision. See Breakwater; Mole; Pile.

Pierce, FRANKLIN (1804-69). President of the U.S.A. Born at Hillsborough, New Hampshire,



Nov. 23, 1804, he was called to the bar in 1827. He was member of Congress, 1833-37, and of the Senate, 1837-42, being a strong Democrat and a consistent supporter of slavery. After serving with distinction in the Mexican War, he was elected president in 1852 by a larger electoral vote than any previous candidate. His presidency was marked by the passage of the Kansas-Nebraska Act; the Ostend manifesto, advocating the acquisition of Cuba by the U.S.A.; the Gadsden purchase; the disappearance of the Whigs and the formation of the Democratic and Republican parties. After his term he took little interest in public affairs, and died at Concord, Massachusetts, Oct. 8, 1869. See Douglas; Gadsden; consult also Lives, Nathaniel Hawthorne, 1852; J. R. Irelan, 1888.



Pier. Promenade pier with T-headed landing stage, showing different systems of construction. Top, plan; below, elevation. A.A. Cast-iron columns planted in firm sand. B. Steel cylinder or caisson planted on rock. C. Steel screw piles driven into firm mud. D. Tram line with crossing at E, where pier is widened to give increased strength sideways. F. Landing stage. G. Low level, ditto. H. Timber fenders. J. Mooring pawls or bollards. K. Pavilion. L.L. Offices and shops. M. Boat pass

growing industries, of which the town is an important centre. It was founded in 1849. Pop. 6,500.

Pie-Powder OR **PIEDPOUDRE**, COURT OF. Ancient court of record connected with every fair or market in England. It was the lowest court of justice, and, with the steward of the lord of the manor or the owner of the tolls as judge, administered summary justice for all commercial injuries in any particular fair or market.

The name pie-powder is the English adaptation of the old French *pieu poudre*, dusty foot (=pedlar)

Pier. In architecture, any isolated vertical mass of masonry, such as the supports of an arch, or the square or round posts on which a gate or bridge is hung. A number of columns grouped or clustered together is known as a compound pier; in this form the pier is a conspicuous feature of medieval architecture from the 10th century.

Bridge piers are the intermediate supports of a bridge, as distinguished from its end supports or abutments, and serve to distribute the weight of the superstructure and its load over a sufficient foundation area to prevent subsidence. They vary from simple timber supports to great masses of masonry on caisson foundations, such as the piers of the Forth Bridge. Timber piers consist of a grillage of cross-piled timber or of vertical posts, or of piles driven into the ground. Small timber piers are termed bents, and high braced piers are usually known as timber trestles.

or other suitable stone built up from their foundations. Cylinder piers are constructed by weighting hollow steel or iron cylinders, sinking them down to the right level, excavating the soil, and filling them solid with concrete upon which the bridge girders rest. See Column; Pilaster; Pillar.

Pier. Jetty or staging projecting into a sea, river, or lake. A pier may be built of stone, being then

more often called a mole, but usually consists of superstructure beams or girders carried upon intermediate supports, such as piles driven or screwed down to a secure foundation, carrying rly. or other traffic, and providing embarkation and landing facilities. In some waters the depredations of the teredo



Pier. Clustered column pier in Norman architecture

render timber unsafe and useless in a short time, and in some cases creosoting proves of little use and steel and iron piers are constructed.

Pierola, Nicolas DE (1839-1913). President of Peru, 1895-99. He was born at Camaná, Peru.



Nicolas de Pierola,
President of Peru

Jan. 5, 1839, and educated at the college of Santo Toribio, Lima. He was called to the bar in 1860; shortly afterwards founded the review, *El Progreso Católico*, and in 1864 became editor of *El Tiempo*. After travelling in Europe, he was, 1869, appointed minister of finance, but in 1872 was charged with misappropriating public funds, and went to the U.S.A. In 1874 he headed an insurrection, but was defeated at Sorota near Tarata, Dec. 3. Revolting again in 1877, he effected a revolution at Lima, and in 1879 became provisional president, but was defeated, and resigned in Nov., 1881. In 1894 he organized a revolt, and became president in the following year. He retired in Sept., 1899, dying June 24, 1913.

Pierre. Capital of S. Dakota, U.S.A., and the co. seat of Hughes co. It is situated on the Missouri, and the Chicago and N.W. Rly., 119 m. W. of Huron, and contains a government industrial school for Indians, a Federal court house, the State Capitol, and S. Mary's Hospital. It is a great cattle market, and uses natural gas. It was settled in 1880 and incorporated in 1883. Pop. 3,200.

Piers Plowman, THE VISION OF. Early English (14th century) allegorical poem written in about 14,000 short alliterative lines on the Anglo-Saxon model. Generally accepted as the work of William Langland, the poem achieved considerable contemporary popularity. Between three and four dozen old MSS. of it are known, these being divisible into three distinct versions. It has been suggested that the poem might be the work of several authors, but the three versions probably represent Langland's first text and two later recensions. The poem throws considerable light on contemporary life and thought, and includes much vigorous satire on the prelates and friars. It was first printed in 1550. Recent editions are that by W. W. Skeat, new ed. 1907, and one in *Everyman's Library*.

Piestany. Town in the Slovakia division of the Czecho-Slovak republic, the former Pöstýén (*g.v.*).

Pietà (Ital., piety, compassion). Representation, in painting or sculpture, of the Virgin mourning

over the dead Christ taken down from the cross; also of any group of the holy women at the Deposition. The episode has formed the motive of innumerable pictures, among which those by G. Bellini, Correggio, Quinten Massys, Van Dyck, F. Francia, and Rubens are noteworthy. See Michelangelo.



Pietà painted by Francesco Francia, representing the Virgin holding the dead Christ, with S. John at His head and S. Mary Magdalene at His feet

National Gallery, London

over the dead Christ taken down from the cross; also of any group of the holy women at the Deposition. The episode has formed the motive of innumerable pictures, among which those by G. Bellini, Correggio, Quinten Massys, Van Dyck, F. Francia, and Rubens are noteworthy. See Michelangelo.

Pietermaritzburg or **MARITZBURG.** City of S. Africa, the capital of the prov. of Natal. It stands



Pietermaritzburg
arms

near the Umsindusi river, 73 m. N.W. of Durban by rly. The chief buildings are the town hall, opened in 1901, the Anglican cathedral, the buildings where the legislature of Natal meets, and others erected for official use, including the law courts. There are also a university college, in the suburb of Scottsville, hospital, library, museum, and theatre. The city has a public park, and there is a botanical garden. The barracks at Fort Napier overlook the city. Pietermaritzburg is an important rly.

junction, being on the main line from Durban to the Orange Free State and the Transvaal. The industries include tanning and brewing, and the making of wagons and bricks. There is a service of electric tramways.

Pietermaritzburg was founded by the Boers in 1839, the name being formed by those of two of their leaders, Piet Retief and Saloman Maritz. It became the capital of Natal in 1842, and was made a borough in 1854. During the Great War German prisoners were confined at Fort Napier. Pop. 30,600, about half whites. See Natal.

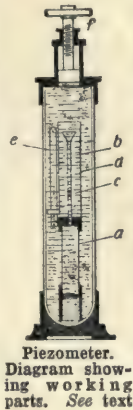
Pietersburg. Town and administrative unit of the Transvaal. It stands near the source of the Sand river, 176 m. by rail N.E. of Pretoria. The centre for the Waterberg goldfields, tin, gold, and corundum are also mined in the neighbourhood. The town was taken by the British in April, 1900. Pietersburg dist. lies W. of Portuguese E. Africa, between the Olifants and Great Shingwetsi rivers. Pop. 4,500, about 1,500 of whom are whites.



Pietermaritzburg, South Africa. General view of the town, with Provincial Council House in the foreground. To the right is the Town Hall

Pietists. Word used vaguely for mystics of many types—often as a term of contempt. It refers strictly to a group of Lutheran reformers, who arose in Germany about 1670, under the leadership of Philip Jacob Spener (1635–1705). He was a Lutheran pastor at Frankfort who held devotional meetings called *collegia pietatis*, whence the name, and established a kind of Methodism. He taught no special doctrines, and founded no sect, confining himself to an endeavour to promote spiritual life generally; but some of his followers adopted a dress and customs rather like those of the Quakers. Under A. H. Francke (*q.v.*), Halle became the centre of the movement, which had much influence for good, but afterwards degenerated into bigotry and emotionalism. See Mysticism.

Pietra Dura (Ital., hard stone). Inlaid work consisting of black marble, jasper, agate, or other hard stones inlaid in wood or marble. It is sometimes called Roman Mosaic, but should be distinguished from mosaic proper, which is embedded in cement. See Mosaic.



Piezometer. Diagram showing working parts. See text

consisted of a thick glass tube closed at each end by a brass cap, one of which was fitted with another tube containing a piston or screw plug, for applying pressure to the liquid in the first tube. This latter tube was fitted with a flask, the neck of which was drawn out into a thin tube and graduated. Pressure on the liquid is communicated to the liquid in the flask by means of a system of valves, and the amount of compression read off on the graduated tube. In the figure, *a* is the piezometer body, *b*, the tube extension containing floating globe *c* of mercury enabling the compression of the liquid to be read off on the graduated scale *d*, *e* is a pressure gauge or manometer, the pressure being shown by the height to which the liquid

presence of an additional bone in the skull for its support. Pigs have conspicuous tusks in both upper and lower jaws, the upper ones being reflected upwards, instead of pointing downwards as in most other animals. Each foot has four toes, of which only the middle two touch the ground when walking. Most of them have large and often pendent ears; their hair consists of bristles set comparatively far apart; and the tail is more or less bare, with a tuft at the tip. Pigs are not ruminative animals, having a simple and undivided stomach.

Of the various wild species, the European wild boar is the best known. All wild pigs frequent marshes and damp places, and this trait is seen in the love of the tame pig for wallowing in any mud it can find; while the habit of turning up the ground with its snout is a survival of the root-hunting methods of its wild ancestors. The Chinese appear to have been the first race to pay attention to the domestication of the pig, though its remains are found in Swiss lake dwellings. The date of its domestication in Great Britain is unknown.

There is little doubt that the domesticated breeds are the descendants of the wild swine of the various countries, the British breeds being derived from the European wild boar, but they have been greatly modified by crossing with Chinese and other Asiatic breeds. Probably as a result of these crosses, domesticated swine have undergone many modifications, even the number of teeth and the vertebrae having changed. The skull has become altered in shape, for example, so that the straight face of the wild swine has given way to the concave one of most of the modern breeds.

Of the white breeds, the large, middle, and small Yorkshire, and the curly coated pig of Lincolnshire are the most important. The large white sometimes reaches a live weight of ten hundred-weight, yields a better proportion of lean to fat than most other breeds, matures early, and turns out equally well for small pork or for heavy bacon flitches. It is a hardy breed, and of quiet and restful disposition—an important point with the fatterer. The sow is very prolific, and makes an excellent mother.

The middle white is the result of a cross between the large and small breeds, and combines the good points of both. It has a short head, turned-up snout, and a general air of compactness. It is



Pietermaritzburg, South Africa. Plan of the capital city of the province of Natal

Piètre Mill. Battle ground in France. Also known as Moulin le Piètre, it was a German strong position adjoining the village of Piètre, slightly N.E. of Neuve Chapelle, on the river des Layes. Both were prominent in the battle of March, 1915, the British 21st brigade being held up by heavy machine-gun fire at the mill on March 10. The village was reached by men of the 7th division two days later. See Neuve Chapelle, Battle of.

Piezometer (Gr. *piezein*, to press; *metron*, measure). Instrument for measuring the compressibility of liquids under varying pressure. The first piezometer was invented by Oersted in 1882, and

consisted of a thick glass tube closed at each end by a brass cap, one of which was fitted with another tube containing a piston or screw plug, for applying pressure to the liquid in the first tube. This latter tube was fitted with a flask, the neck of which was drawn out into a thin tube and graduated. Pressure on the liquid is communicated to the liquid in the flask by means of a system of valves, and the amount of compression read off on the graduated tube. In the figure, *a* is the piezometer body, *b*, the tube extension containing floating globe *c* of mercury enabling the compression of the liquid to be read off on the graduated scale *d*, *e* is a pressure gauge or manometer, the pressure being shown by the height to which the liquid

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chiefly in demand for the pork trade, and is a useful pig for crossing with coarse and nondescript breeds to improve their quality.

The curly-coated pig of Lincolnshire is a very ancient breed. Its abundant curly hair gives it a very characteristic appearance. It is hardy, matures rapidly, and yields well for either pork or bacon.

Of the coloured breeds, the Tamworth, mainly to be seen in the districts around Birmingham, more closely resembles the wild boar, from which it is a more direct descendant, than any other breed. It is long, and nearly straight in the head, and its body is covered with long, red hair. It is a particularly hardy animal, and yields well in bacon, with a good proportion of lean; but it has the

scrupulously clean. Frequent whitewashing of the walls of the sty and court greatly conduces to cleanliness. Litter should be provided, peat moss being avoided, as the pigs are apt to devour it. Wheat straw is best for very young pigs, while fattening pigs can entirely dispense with litter. When pigs are kept in confinement a lump of rock salt should be provided.

Pigs are omnivorous, and when they chiefly live on the waste products of the farm are very profitable. Apart from swill, with whey and buttermilk from the dairy, to which skim milk may with advantage be added, barley meal, brewers' grains, peas, beans, oats, and maize are all useful foods. In the fattening process, which gives the best result if crosses are

blast furnace it is usually directed into a channel about eight ins. wide formed in a bed of sand; branching off from each side of this channel at short intervals there are formed moulds in the sand communicating at one end with the main channel. These moulds are from two ft. six ins. to three ft. six ins. long, from three to five ins. wide and four to six ins. deep. When the channel and the moulds are filled with the metal they suggest the idea of a sow lying on her side suckling her young; the channel is therefore called the sow and the blocks of metal formed in the moulds are called pigs. In the United Kingdom there were 345 blast furnaces in 1905, and in 1918 the number was 318. The total (tons) of pig-iron made was about 8,000,000 in 1920. See Iron.

Pigeon. Name applied to the various species of birds of the order Columbiformes, which includes the pigeons proper, the doves, and the extinct solitaire and dodo (*q.v.*). There are about 60 genera included in this order, and the typical pigeons, *Columba*, number about 70 species, distributed over nearly the whole world with the exception of the polar regions.

Most pigeons are strong fliers. They are all monogamous and pair for life when under natural conditions, the promiscuous courtships of the domestic pigeon being simply a mark of degeneracy due to life under abnormal circumstances. Both cock and hen assist in the incubation and care of the young. The eggs are always white, and one or two in number.

The birds of this group are all marked by the possession of a very large and distensible crop, which enables them to take huge meals. A pigeon has been known to eat more than its own weight in food at a meal. Another peculiarity of the group is that the young are fed with partially digested food by the parents, whose crops during the rearing season secrete a peculiar fluid—the so-called pigeon's milk.

In Great Britain three species of pigeon occur in the wild state, the stock dove, the wood pigeon, and the blue rock pigeon. The turtle dove also breeds in Great Britain, but it is only a summer visitor, arriving early in May and leaving in Sept. It is smaller than the three other species and is found in woods, where it is seldom seen, as it keeps within the densest foliage. It is spread over the whole of Europe, except the extreme N., and in winter migrates to Africa.

The stock dove may be distinguished from the common wood pigeon by its smaller size and



Fig. Modern pigsties of corrugated iron and concrete around a yard covered with straw litter

By courtesy of *The Agricultural Gazette*

great disadvantage that it matures very slowly. It makes a very good cross for introducing hardiness into a delicate breed.

The Berkshire breed is black, with the exception of the face, feet, and tip of the tail. It is now the most popular type of coloured pig; and where colour is not objected to in the market, it is a very profitable breed to keep. It is hardy even in hot climates, breeds freely, matures early, and produces fine hams.

The large and small black pigs have been the subject of much attention of late, and have been developed much on the lines of the large white breed. They are prolific, and yield well in bacon of the best quality, while a cross between these breeds and the Berkshire produces an excellent all-round strain of general utility.

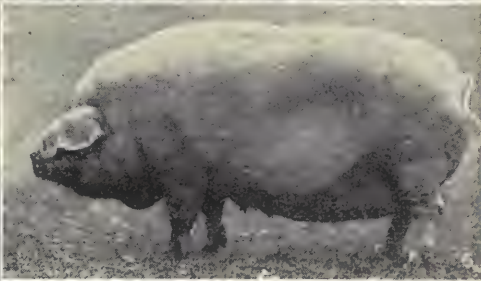
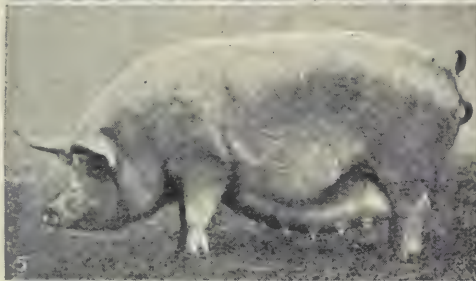
A few general principles may be borne in mind with advantage. The pig is not a lover of filth, but is quite a clean animal if given the opportunity. Hence the usual condition of the pigsty is quite as wrong and objectionable as a dirty stable or cow-byre, and tends to impair the health of the animals. Sties should have a S. aspect, should be large, well ventilated, and well lighted, and be kept

used, too much maize conduces to flabbiness in the flesh, while an excessive use of peas and beans causes hardness. Various roots are added to the dietary in winter, and such things as clover and vetches in the summer; pigs are often turned out to forage for themselves in grass fields or over stubble. They require frequent feeding, but in small amounts.

Pigs are weaned at from six to eight weeks after birth, and until they are able to feed miscellaneously their diet largely consists of a mixture of sharps and bran, with an increasing amount of barley meal, and skim milk when available. Before they reach the age of about five months the sharps and bran should be replaced by meal. See Animal; Babirusa; Bacon; Mammal; Pork; Swine-fever.

W. J. Wintle
Bibliography. Pigs: Breeds and Management, S. Spencer, 1897; *The Book of the Pig*, J. Long, 2nd ed., 1906; *British Breeds of Live Stock*, Board of Agriculture and Fisheries, 1910; *British Pigs: The Art of Making Them Pay*, J. Long, 1918; *The Pig: Breeding, Rearing and Marketing*, S. Spencer, 1919.

PIG OR PIG IRON. Term used for a particular form of casting of iron. When molten iron is run out of a



1. Tamworth boar. 2. Large Black sow. 3. Wessex Saddleback sow. 4. Gloucester Old Spots sow. 5. Large White sow. 6. Lincoln Curly-coated sow. 7. Cumberland sow. 8. Middle White Breeding sow. 9. Essex sow. 10. Berkshire sow

FIG: PRIZE SPECIMENS OF FAMOUS BRITISH BREEDS

By courtesy of The Agricultural Gazette



Pigeon. Examples of crested and other varieties. 1. Porto Rico pigeon. 2. Wonga-wonga, Australia. 3. Blood-breasted, Philippines. 4. Nicobar pigeon. 5. Crowned, New Guinea. 6. Crested, Australia

plainer grey plumage. It is found mainly in the S. and E. counties of England, and is scarce farther N.

The wood pigeon is much the largest of the three native species, and is one of the common objects of the country, where it does great damage by consuming peas, corn, and newly planted seeds. The white patch on either side of the neck at once distinguishes it from the other species. This is the species that is common in the various parks and open spaces in London.

The blue rock pigeon, a smaller bird with bluish-grey plumage, is mainly found around the N. coasts of Scotland and Ireland, where it nests on ledges in caves or in crevices in the rocks. It is from this pigeon that the various domesticated breeds have been derived.

The domestication of the pigeon and its use as a message bearer date from an early period. No remains of it have been found in prehistoric encampments or kitchen middens, but it was well known to the Greeks and Romans, who used messenger pigeons, while the rock pigeon and the turtle dove are several times mentioned in the O.T.

The domesticated pigeon has received great attention at the hands of fanciers, and the number of strains is now very large. Many of these birds differ in form to such a degree that they appear to

be almost different species. Darwin selected this fertile group for the study of variation in relation to the evolution of species.

The pouter is distinguished by its enormous crop, long feathered legs, and upright carriage, which give it an eccentric and uncomfortable air. The carrier, which is not now the message-bearing bird, is known by the large naked callosities around the eyes and the base of the bill. The runt is noted for its large size, and has a long massive bill. The barb is known by its very short and broad bill, and has broad callosities round the eyes.

The fantails, of which there are several sub-varieties, are distinguished by their upstanding expanded tails, the feathers of which are often directed forwards over the head. The normal number of tail feathers in the typical pigeon is twelve, but the fantail usually has about thirty, and occasionally as many as forty. The owl pigeon and turbit have a very short bill, and the feathers diverge down the front of the neck and on the breast.

The tumbler is a small bird, and gets its name from its habit of tumbling backwards during flight. The Jacobin is easily recognized by the feathers of the neck forming a kind of hood which almost encloses the head. The trumpeter, named

from its peculiar, prolonged coo, has a tuft of feathers at the base of the bill which curl forwards.

The homer is the pigeon used for bearing messages. It has the homing instinct highly developed, but its skill in finding the way home is simply due to keenness of vision. A bird taken quite out of its own district will get hopelessly lost in the absence of any familiar landmark.

Pigeons are fairly hardy birds, but need reasonable attention to keep them in good condition. They should have a roomy and well-ventilated loft, be kept dry and guarded against draughts; have varied food, and a good supply of fresh water for both drinking and bathing. See Birds, colour plate; Feather; Flight; Fruit Pigeon; Pigeon, colour plate.

Bibliography. Pigeons, W. B. Tegetmeier, 1868; Fancy Pigeons, J. C. Lyell, 3rd ed. 1887; The Book of Pigeons, R. Fulton, ed. L. Wright, new ed. 1895; Variation of Animals and Plants, C. Darwin, new ed. 1905; Pigeons and All About Them, C. A. House, 1920.

Pigeon Flying. Sport in which pigeons race against one another. It developed from the ancient practice of using pigeons to carry messages, and first became popular in Belgium, where races were instituted about 1820, a special type of bird being bred for them. It was introduced into England about 1871, Belgian birds being brought over. In 1880 a club was founded, and in 1896 the National Homing Union, the controlling body of the sport, came into existence. About 1875 the sport began to be popular in the U.S.A.

Racing pigeons may be divided into two varieties, sprinters and long distance performers, birds flying any distance up to 250 m. coming in the former category, and those able to accomplish as much as 500 m. in the latter. The usual plan is to take the birds the necessary distance from their homes and then to release them, when they will fly back. Hence comes the term homing pigeon or homer. Some birds can fly nearly 2,000 yds. a minute, and one has been known to fly over 1,000 m. Squeakers, as the young birds are termed, should be trained gradually by increasing the distance each day, and should be able to accomplish a flight of 100-150 m. by the end of the first season. Rings with identification marks are placed on their legs. The organ of the sport is The Racing Pigeon, and there are a large number of clubs in existence. See Pigeon Racing, W. E. Barker, 1913; The Origin of the English Homing Pigeon, J. Wormald, 1913.



1. Rock dove (*Columba livia*), the origin of domesticated species. 2. Common Dovecote Pigeon. 3. Norwich Cropper. 4. Fantail. 5. Jacobin. 6. Magpie. 7. Blue Dragon. 8. Alcan Owl. 9. Scanderoon. 10. Blue Bald High

flying West of England Tumbler. 11. Blue Pouter. 12. Trumpeter. 13. Short-faced Almond Tumbler. 14. Blue Turbit. 15. Black Carrier. 16. Blue Chequer Show Homer. 17. Red Chequer Short-faced Antwerp

PIGEON : EXAMPLES OF THE BIRD BRED FOR EXHIBITION PURPOSES



1. Wheat: ripe ear, flower spike, and foliage. 2. Oats. 3. Barley: flower spike, ripe ear, and leaves. 4. Maize: plant and ripe cob. 5. Rice: plant and ripe head. 6. Tea. 7. Hops. 8. Vanilla: flower and pod. 9. Cotton: flower branch, and bursting pod. 10. Flax. 11. Sugar Cane. 12. Coffee. 13. Cacao. 14. Para indiarubber plant. 15. Tobacco. 16. Hemp. 17. Indigo

PLANTS CULTIVATED FOR THEIR GREAT COMMERCIAL VALUE

Pigeon House. Building to accommodate pigeons, known also as a columbarium. In the Middle Ages nearly every castle, manor house, and monastery had its detached building with nests for pigeons, these birds being a favourite article of food, and their culture inexpensive to the owners, inasmuch as they preyed on the fields of the tenants. The pigeon house was usually a round tower, with an opening at the apex of its conical roof, protected by an upper roof, through which the birds could come and go. Inside the walls were pitted with small recesses for the nests. In the centre was a revolving post with horizontal arms extending almost to the wall, and at the ends of these arms was fixed a vertical ladder, by means of which access could be had to the nests.

Pigeon Post. Mail service carried on by trained homing pigeons. This method of transmitting news has frequently been employed in war-time, particularly in attempts to maintain communication between the defenders of a besieged town, e.g. Paris, 1870-71, and their friends outside. It is also used for naval purposes in emerg-

Carlo. The competitions, in which experts from many countries took part, were held on a lawn situated below the terrace of the Casino. The birds, whose tail feathers were cut as a preliminary, were let loose from dark traps, and driven up into the blazing sunlight for the shooters.



Pigeon Post employed by the British Army in the Great War. 1. Dispatch rider with pigeon basket. 2. Message being removed from clip attached to bird's leg. 3. Pigeon loft behind the lines

ency, and by the airmen on sea-patrol work in case of a forced landing at sea, etc. The message, written in cipher in small compass, is rolled in a quill, which is attached to the bird. During the Great War the British and French maintained an excellent pigeon service on the west front. The French employed pigeons almost from the start, and the British first sent over pigeons to France in March, 1916. Similar services were established at Salonica, and in Egypt and Mesopotamia.

Pigeon Shooting. Shooting of practically tame pigeons released from traps. The place where pigeon shooting was most cultivated was, until recently, Monte

Carlo. The competitions, in which experts from many countries took part, were held on a lawn situated below the terrace of the Casino. The birds, whose tail feathers were cut as a preliminary, were let loose from dark traps, and driven up into the blazing sunlight for the shooters.

Pigment. In animals, the colouring matter in the dermis or epidermis. Brown to black in most mammals and in man, it is found in the cells of the Malpighian layer. The colouring matter of birds is chiefly found in the feathers. In the case of crustaceans, many fish, and insects there are special colour-secreting cells.

Animal pigments consist chiefly of *melanin*, a black colouring matter insoluble in water, alcohol, acid, or ether; *zoöerythrin*, a red colouring matter found mainly in the feathers of birds; and *zooxanthin*, a yellow pigment, also a bird colouring matter. Certain pigments are confined to certain animals, e.g. the *turacin* pigment of the *Musophagidae*. *Haemoglobin*, the red colouring matter of blood, and its derivatives are the best known animal colouring matters from a chemical point of view, the great majority of animal pigments being present in such small quantities, though giving a large coloration effect, as to make accurate chemical analysis difficult. Much of the colour of many animals is due to a peculiar absorption of light, and not to pigments. See Colour; Skin.

Pigment (Lat. *pingere*, to paint). Insoluble coloured powder used in painting. The pigments of the ancients were mainly obtained from minerals and earths and were comparatively few in number, but they are the basis of most modern colours. Chief among them were *ultramarine*, derived from *lapis lazuli*; yellow, from *ochre* and *sienna* earths; red, from *oxide of iron*; green, from *terre verte*, a silicate of iron, or from powdered *malachite*; white, from *lime*, *white lead*, or *oxide of zinc*; black, from *burnt bones* or *ivory*.

Some, obtained neither from minerals nor earths, achieved fame, e.g. *Tyrian purple*, derived from a shellfish. The ancient Irish obtained a purple from a rock lichen, which they used for dyeing stuffs, and possibly for illuminating MSS. *Sepia* is derived from the cuttlefish. The pigments of the ancients were used with but little modification up to the 16th century.

The principal modern pigments are: *Prussian blue*, discovered in the 18th century, composed of *ferrocyanide of iron* and *potassium*, with the *Antwerp*, *Paris*, and *Chinese blues* as its derivatives; *alizarin* reds, obtained from *coal tar*, which are imitations of the old *crimson* and *madder* lakes; *Prussian brown*, which is *Prussian blue* calcined; *emerald green*, prepared from *copper*, *arsenic*, and *acetic acid*; a bluish green called *oxide of chromium*, of which a popular form is the *French vert de Guignet*; various *cadmium yellows*, prepared from *sulphide of cadmium*; *chrome yellows*, from *chromates of lead*; *cerulean blue*, of which the best variety is a *stannate of cobalt*; *French ultramarine*, which is composed of the *alumina*, *soda*, *silica*, and *sulphur* contained in *lapis*

lazuli, but derived from cheaper materials, is little inferior to or less permanent than the ancient pigment. See Painting.

Pigott, RICHARD (c. 1828-89). Irish journalist and forger. A native of Meath and associated with

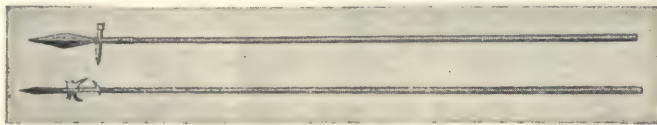


Richard Pigott, Irish journalist

several journals of an extreme Nationalist type, he forged papers purporting to incriminate Charles Stewart Parnell (q.v.) in the murders of Lord Frederick Cavendish and

Thomas H. Burke in Phoenix Park, Dublin, May 6, 1882. His guilt having become apparent in cross-examination before the Parnell Commission, he confessed to H. Labouchere, fled to Spain, and shot himself in Madrid, March 1, 1889. See his Personal Recollections of an Irish Journalist, 1882; Life of Henry Labouchere, A. L. Thorold, 1913.

Pig-sticking. Wild boar hunting. Riding to hog, as the sport of pig-sticking is termed, is one of the



Pike. Examples of the weapon as used, top, in the Parliamentary army; below, by troopers of Charles II

most exciting forms of hunting to be enjoyed in India.

The pig-sticking season lasts from Feb. to July. Hunting parties usually camp out overnight. An early start is made in the morning, when natives are sent out to beat the surrounding jungle. The mounted huntsmen are stationed in parties of three or four, and directly a boar breaks cover the party nearest to it proceeds to ride it down. Only the male pig is hunted. As soon as the first spear

has been driven into the boar it will probably turn and show fight, charging the pursuers again and again until finally rolled over. See Pig-sticking or Hog-hunting, R. S. S. Baden-Powell, 1889.

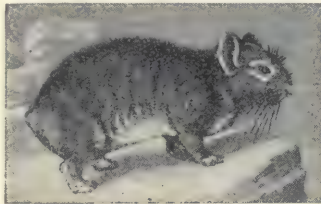
Pigtail. Long plait of hair worn at the back of the head. Among



Pigtail as worn by a Hong Kong artist

the Chinese the shaven head and pigtail were a mark of servitude imposed upon them in the 17th century by their Manchu conquerors. Later it became a source of pride to the Chinaman, but is gradually going out of favour, especially since the revolution of 1911. A queue or pigtail was worn in the British army and navy until 1808. See Wig.

Pika OR **TAILLESS HARE** (*Lepus*). Genus of rodents. Found in Russia, Asia, and N. America,



Pika or tailless hare of the mountains of Russia and N. Asia

they live among the mountains, burrowing and living in crevices of the rocks, and feeding mainly on grass. The pika is about the size of a guinea-pig. See Rodent.

thickly spotted with a lighter tint, and silvery on the under parts. It has the power of considerably modifying its hue to match its surroundings. It is noted for its great voracity, preying not only on other fish, but upon water fowl, water voles, frogs, and worms. Small specimens are known as jack, and afford good sport. See Angling; Fish.

Pike Perch (*Lucioperca*). Genus of fish, belonging to the perch family. They occur in the rivers



Pike Perch of East European rivers
W. S. Berridge, F.Z.S.

of E. Europe, Asia, and N. America. Three to four feet long, and pike-like in shape, they prey upon other fish.

Pike's Peak. Peak of the Rocky Mountains, in Colorado, U.S.A. It is 7 m. W. of Colorado Springs, is named after Lieut. Z. M. Pike, who discovered it, 1806, and its alt. is 14,108 ft. The first ascent was made by Major S.H. Long in 1819. A rack and pinion rly., 9 m. long, was opened in 1891, and in 1905 a searchlight was erected.

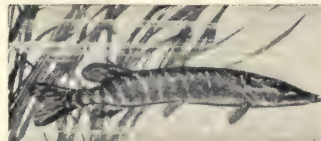
Pilaster (Ital. *pilastr*, from Lat. *pila*, a pillar). In architecture, a flat-faced pier engaged with or attached to a wall, from which it projects slightly. It has a capital, shaft, and base, and in Roman work was used as a respond to the column. Renaissance builders often used it, and it figures largely in the Palladian style (q.v.).



Pilaster in modern classic architecture

Pilate, PONTIUS (Lat. *Pontius Pilatus*).

Roman procurator or governor of Judea, A.D. 26-36. His administration was severe and offensive to the Jews, of whom he was contemptuous, but the N.T. narratives of the trial of Jesus before him credit him with a sense of justice and a desire to save Him. Only when the Jews threatened Pilate with a charge of treasonable complicity with a pretender, did he hand over Jesus into the hands of His



Pike. Specimen of the voracious fresh-water fish

accusers to be crucified (Matt. 27; Mark 15; Luke 23; John 18-19). Called to Rome to answer charges against him, Pilate is said to have been banished to Gaul, and to have committed suicide. The Copts declare that he died a Christian martyr; the Ethiopic Church regards him as a saint, his day being June 25. His wife, Claudia Procula or Procla (Matt. 27), is honoured by the Greek Church as a saint, her day being Oct. 27. Apart from the N.T. the authorities for the character of Pilate are Philo, Josephus, and Eusebius. See Jesus Christ.

Pilatus. Mountain mass of central Switzerland. Situated between the cantons of Lucerne and Unterwalden, about 5 m. S. of Lucerne, alt. 6,996 ft., it commands one of the most extensive views in Switzerland. The Fractus Mons of the ancients, in the Middle Ages it was called Mons Pileatus—the capped mountain, from its generally cloud-capped summit. From a misunderstanding of this name arose the legends connecting the mountain with Pontius Pilate. There is a mt. rly. for tourists.

Pilch, FULLER (1803-70). English cricketer. Born at Horningtoft, Norfolk, March 17, 1803, he became a tailor. A keen cricketer, he was soon playing for the county, two brothers winning the same distinction, and was a member of a strong eleven at Bury St. Edmunds. In 1827 he played for England, as he did later, and from 1836-54 he was a regular member of the Kent team. He died May 1, 1870.



Fuller Pilch,
English
cricketer

From a print, 1847

Pilchard (*Clupea pilchardus*). Fish of the herring family. Found in the English Channel west of Portland, off the coasts of Portugal and Spain, there is a smaller race in the Mediterranean. It is about 8-10 ins. long at maturity, and may be distinguished from the herring by the larger size and smaller number of the larger scales and by the absence of teeth. Immature pilchards in their first year taken off the W. coast of France and tinned in oil are the true sardines of commerce. Pilchards are taken off the Cornish shore in the late autumn and throughout the winter. The seine net is chiefly used, and the shoals



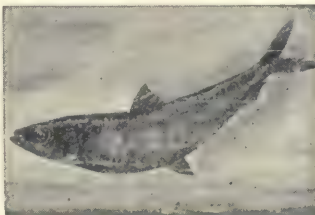
Pontius Pilate washing his hands
after sentencing Jesus. From the
painting by M. Wohlgenuth
Royal Institution, Liverpool



Pilatus, Switzerland. Summit of the mountain from the west; in the centre distance are seen the Lake of Lucerne and the Rigi mountain heights

are located by watchers or "huers" stationed on the cliffs, who detect them by the reddish tinge which they give to the water. The immature pilchards thus taken, are at once slightly salted, packed in barrels, and shipped to the Mediterranean, to be re-shipped as sardines. See Sardine.

Pilcomayo. River of central S. America, the chief tributary of the Paraguay. It rises in the S. of Bolivia and flows in a S.E. direction, uniting with the Paraguay near Asunción. It traverses the Gran Chaco (q.v.), and forms part



Pilchard. Large-scaled fish of the
herring family

of the boundary between Argentina and Paraguay. The principal affluents are the Pilaya and the Paspaya. Its estimated length is about 1,300 m.

Pile (Lat. *pilum*, javelin). In heraldry, a wedge-shaped charge. borne pendant from the top of the shield, the point ending a short distance from the base. A pile can be borne "reversed," pointing upwards. See Heraldry and colour-plate.

Pile (Lat. *pila*, pillar). In electricity, a voltaic or galvanic dry battery. There are several types, of which Zamboni's dry pile is illustrative. This consists of many paper disks with a coating of tin or silver on one side, and binoxide of manganese on the other. Many hundreds or even thousands of these disks may be piled and clamped together by two metallic rods which serve as terminals.

Pile and Pile Driving. Method of providing support in soft or submerged ground for bridges, piers,

jetties, and foundations. The piles may project into the air and be part of the superstructure, as in a trestle bridge; or be completely embedded and act merely as a hard surface. The most usual form of pile is a balk of timber—pitch-pine, oak, greenheart, or Tasmanian gum—sharpened at the lower end, shod with a pointed steel shoe, and ringed at the top to prevent splitting. The toe of such a pile is shown in section in Fig. 1

In Fig. 2 is shown an octagonal timber pile with a screw point, and in Fig. 3 an all-metal screw pile, the point of this pile may be either of cast iron or cast steel; the body may be in the form of a tube of iron or steel; the upper portion of the screw is given the great width shown in order to increase the contact and bearing surface. Reinforced concrete piles are now employed for many purposes, as being more durable than timber. A part section of such a pile is shown in Fig. 4, in which A, A are wrought iron or steel rods tied with thick

iron wire and embedded in the concrete mass.

The term sheet piling designates piles driven in contact to form a continuous wall, as that of a cofferdam, to exclude or include water, or support ground. In Fig. 5 is shown a section of ordinary timber sheet piling with splayed or shear shoes, S, S^1, S^2 , and in Fig. 6 a special form of sheet piling composed of cast-iron column piles, with cast-iron plates fitted in the space between two of the piles. This type of

piling was used in the building of the present Westminster Bridge. Steel plates with their vertical edges shaped to form interlocking joints, as shown in Fig. 7, are convenient for sheet piling.

With the exception of screw piles, which are sunk by rotation, a pile is driven by allowing a heavy iron ram, weighing from a few hundred-

head. In the simplest form of pile-engine the ram is raised by a rope passing over a pulley at the top, pulled up by a hauling gang, and then released. Heavy rams are raised by a hand winch or steam power, and tripped automatically, or by a hand-controlled trigger, on reaching the height desired. An ordinary arrangement is shown in Fig. 8, where A is the steam boiler, B the steam engine driving winch C, D a pile being driven, E the faller or tup, F the trigger gear, which, when pulled by cord G, releases the faller and allows it to drop on the head of the pile as shown in dotted lines at H; J is a weight which causes the trigger to follow after

is shown in Fig. 9, where A is the steam cylinder; B, hammer head or tup, which, striking the head of the pile, drives it gradually down, the cylinder and attachment moving with it; C is a cage which slides along the upright, and in which the head of the pile is secured by cramps until the pile is driven home. Driving is continued till a specified depth is reached, or the entry per blow sinks to a specified figure. Progress through hard sand is made easier by disturbing and softening the material under the point with water.

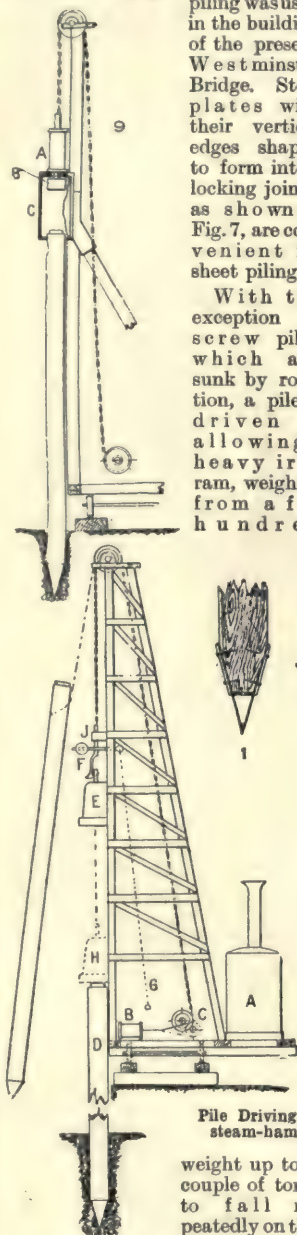
Pile-Dwelling. Primitive habitation built on piles. In the neolithic and early metallic ages the palafitte type was widespread in central Europe. In England, pile-foundations have been found at Walbrook, London, Barton Mere in Suffolk, and Pickering, Yorkshire. Island strongholds of the fascine type—traceable in Holderness, Yorkshire; at Llangorse, Brecknockshire; and in Glastonbury lake-villages—are numerous in Scotland and Ireland. In Bosnia pile-villages were erected along the Danube tributaries during the period from the Neolithic to the early Iron Age.

Pile-construction survives in every continent. Pile-houses, observed by Amerigo Vespucci in the Maracaibo Gulf in 1499—whence the name Venezuela, little Venice—are still erected in the Caribbean lagoons. In Florida they are built on flood-land. The use of pile-granaries, even when the dwellings are on the ground level, is widespread in Africa, and occurs in other parts of the world. See Lake-dwelling; consult also Lake Dwellings, F. Keller, Eng. trans. J. E. Lee, 2nd ed. 1878; The Lake Dwellings of Europe, R. Munro, 1890.



Pile-Dwelling in the Dutch East Indies. Head-man's communal house in Sié village, South Pagi Island, Sumatra

By courtesy of the Smithsonian Institute

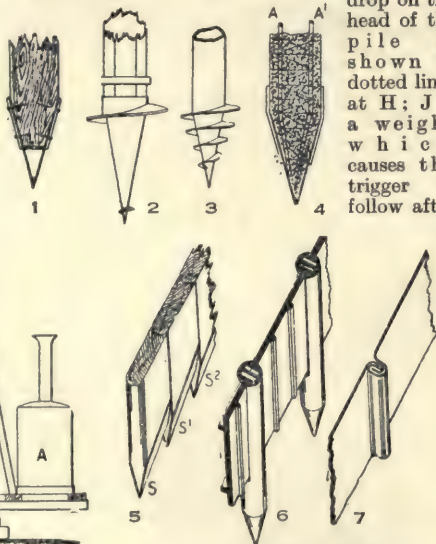


Pile Driving. Details of steam pile-driving machine, steam-hammer pile driver, piles, and piling. See text

weight up to a couple of tons, to fall repeatedly on the

the faller and to pick it up again. A new pile being raised into position for driving is also shown.

A form of steam-hammer driver



Pile Fabric. Textile distinguished by the hair (Lat. *pilus*) or fibre left standing upon the surface. Pile can be produced in cloth finishing by breaking or tearing out fibre from the threads of the structure, or may be created in weaving. The pile of a blanket is an example of the former, and that of a velvet of the latter. Woven pile exists first as a loop and is left as such in "terry" goods. The loops may be cut as in plain velvet, the fibres of the yarn being opened out to form a dense cover. As in some figured velvets, cut and loop pile exist in the same fabric, forming regular designs. Plush is a long-piled velvet, and imitation furs made by weaving or knitting are pile fabrics.

Piles. Dilatations of veins in the mucous membrane of the rectum. See Haemorrhoids.

Pilewort (*Ranunculus ficaria*) OR LESSER CELANDINE. Perennial herb of the natural order Ranunculaceae. It is a native of Europe, W



Pilewort. Flowers and leaves of the Lesser Celandine

Asia, and N. Africa. The root-fibres develop into a bunch of small tubers resembling on a very small scale those of the dahlia. The long-stalked heart-shaped leaves appear by copse and hedgerow very early in the year, and are soon followed by the bright golden flowers. Though of the same genus as the buttercups, the flowers are more starry than cup-shaped, the petals spreading. The fruits are nutlets (achenes), and are furnished with minute oily food-bodies (elaiosomes). These are eaten by ants, which thus assist in the distribution of the species by carrying the seeds away and dropping them after removal of the food-bodies.

Pilgrim (Lat. *peregrinus*, foreign). One who from religious motives journeys to visit some place considered sacred, as the scenes connected with the life of Christ or the tomb of a saint. Pilgrimages, made often for the cure of sickness or in thanksgiving for cure, are common in the histories of most important religions.

Examples are the pilgrimages of the Jews to Jerusalem during great festivals; of the ancient Greeks to the shrines of Apollo at Delphi, Diana at Ephesus, etc.; of the Indian sects to the shrines of Rama and Krishna; of Buddhists to the scenes of Gautama's life; and of Mahomedans to Mecca.

Among Christians the practice was not unusual as early as the close of the second century. The first notable instance on record is that of Alexander, the friend of Origen, who, in 212, "made a journey to Jerusalem for the sake of prayer and investigation of the places." But it was the visit of S. Helena, the mother of Constantine, to Jerusalem in 326, when she is supposed to have discovered the Holy Sepulchre and the relics of the Cross, that gave the great impulse to the practice of pilgrimage which reached such vast development in the Middle Ages.

Next after the Holy Land, the tombs of the Apostles at Rome became the great centre of pilgrimage. Pilgrims also visited the tomb of S. Thomas in India, that of S. John at Ephesus, Mt. Sinai, and the shrine of S. Martin at Tours. As early as the 7th century, laws were made giving special protection to pilgrims on their journeys; and Charlemagne in 796 exempted pilgrims from tolls. Pilgrims very commonly wore scallop shells as badges, though this was more correctly restricted to those who had visited the shrine of S. James at Compostella. In the Middle Ages the practice of pilgrimages became much abused, and a class of professional pilgrims arose, no better than tramps and mendicants, who led a wandering life and subsisted on charity. The custom died down in the Renaissance period; but still survives locally to some extent, e.g. at Lourdes in the S. of France. In Great Britain the shrine of S. Thomas Becket at Canterbury, of S. Alban at St. Albans, and of Our Lady of Walsingham were noted centres of pilgrimage, among many others. See Lourdes; Palmer; consult also Pilgrimages to S. Mary of Walsingham and S. Thomas of Canterbury, D. Erasmus, trans. J. G. Nichols, 1849; Scudamore, in Dict. of Christian Antiquities, W. Smith and S. Cheetham, 1893; Bede Jarrett, in Catholic Encyclopaedia, 1907-12.

Pilgrimage of Grace. Name given to a rising which took place in the N. of England in 1536 and 1537. The suppression of the smaller monasteries, unemployment caused by the extension of sheep-farming, and other grievances, led to an insurrectionary move-

ment in Lincolnshire which soon spread to Yorkshire. Under Robert Aske, Lord Darcy, and Sir John Constable, the rebels, estimated at 30,000, entered York, their standard being a banner displaying the five wounds of Christ. They asked for the restoration of the religious houses, the removal of Cromwell from the privy council, and the deprivation of heretic bishops. Marching S. to Doncaster, they met the duke of Norfolk with a royal army by the river Don, and negotiations were begun, for Norfolk was too weak to fight. In the king's name he promised the rebels a free pardon and a parliament at York, and they dispersed.

Nothing being done to carry out these promises, insurrection broke out again in Cumberland and Westmorland. Henry VIII thereupon ordered the arrest of the leaders of the original rising, and, with four abbots and several other laymen, Aske, Darcy, and Constable were executed for treason. Instead of the promised parliament a Council of the North was established at York. See Aske, Robert.

Pilgrim Fathers, THE. Term applied to the English founders of Plymouth Colony, Massachusetts, in 1620. They belonged to the church founded by John Robinson at Leiden, in Holland. Seeking religious liberty, they had separated from the established Church in England, but while well treated in Holland, desired to retain their native language and customs.

Obtaining from the Virginia company a grant of land in New Jersey, and a promise, obtained by Sir Edwin Sandys from the king, that their freedom to worship as they pleased should not be interfered with, they set sail from Plymouth in the Mayflower, in all 78 men and 24 women, Sept. 6, 1620. By stress of weather they were forced to land, Dec. 21, on the coast of Massachusetts, far S. of the territory granted to them, and here they founded Plymouth Colony. The tercentenary of their sailing was commemorated on an extensive scale in England, Holland, and the U.S.A. in 1920, notably at Southampton. The Massachusetts Bay Colony, founded by English Puritans in 1629-30, and Plymouth Colony were united in 1691. The Pilgrim Fathers' Memorial Church in New Kent Road, London, was enlarged in 1856 by Americans in memory of Southwark men who sailed in the Mayflower. See Jordans; Mayflower, The; Robinson, John; Sandys, Edwin; Scrooby.

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Wilson, 1849; The Pilgrims and the Anglican Church, W. Deverell, 1892; The Story of the Pilgrim Fathers, 1606-23, E. Arber, 1897; The England and Holland of the Pilgrims, H. M. and M. Dexter, 1906; The Pilgrims and Their History, R. G. Usher, 1918; The Pilgrim Fathers of New England, J. Brown, 4th ed. 1920; The Last of the Mayflower, J. R. Harris, 1920.

Pilgrims' Club. Anglo-American dining club. Founded in 1902, it has two branches, one in London and the other in New York, and



Pilgrim Fathers. The departure from Delfshaven, July, 1620. From the fresco in the Peers' Corridor, British Houses of Parliament, by C. W. Cope, R.A. Top, right, The Landing of the Pilgrim Fathers in Massachusetts. From the painting by G. H. Boughton, R.A.

exists to promote good feeling between the two peoples. The offices in London are at the Savoy Hotel, W.C.

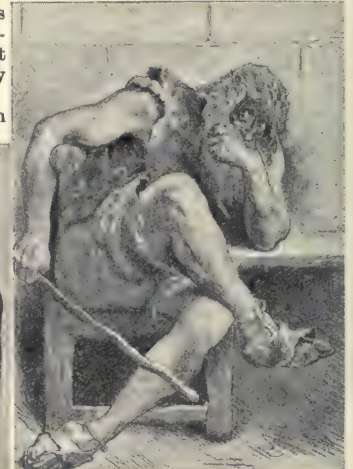
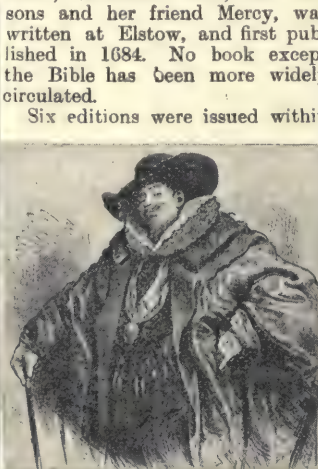
Pilgrim's Progress, THE. Religious allegory by John Bunyan. The first part, which describes the

adventures of Christian and Hopeful on their way from the City of Destruction to the Celestial City, was written in Bedford gaol and first published in 1678. The second and inferior part, concerned with the journey Heavenwards of Christiana, Christian's wife, her four sons and her friend Mercy, was written at Elstow, and first published in 1684. No book except the Bible has been more widely circulated.

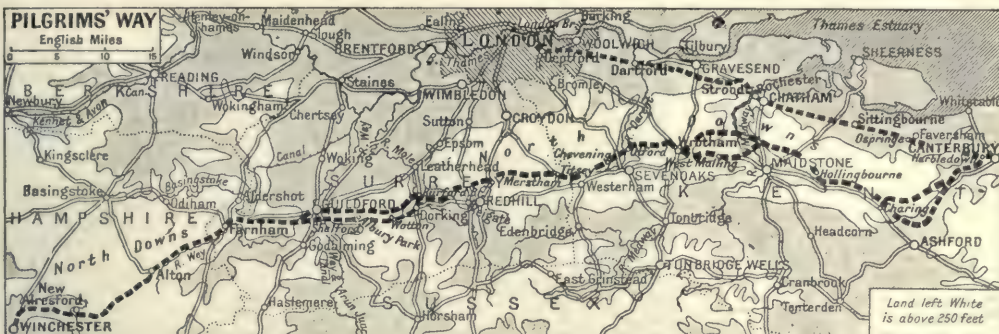
Six editions were issued within

two or three years, but only nine copies of the first edition are known. According to an article in The Times Literary Supplement of Oct. 13, 1921, the three perfect copies are Sir George Holford's, of which a facsimile was issued in 1888; one in the Rylands Library, Manchester; and one in the British Museum. A practically perfect copy is the property of H. E. Huntingdon, an American collector. Excepting the 7th and 17th editions, no copies of which are known, the longest "run" of editions is in the Lenox Library New York. See Bunyan.

Pilgrims' Way, THE. Track along which pilgrims from the W. travelled through Winchester to visit Becket's shrine at Canterbury. Of its 120 m., portions are traceable over 72 m., mainly along the scarp of the N. Downs, by way of Alresford, Farnham, Shalford, Albury Park, Wotton, Burford Bridge, Merstham, Titsey, Chevening, Otford, Wrotham, West Malling, Hollingbourne, and Charing.



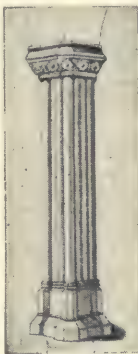
Pilgrim's Progress. Characters in John Bunyan's famous allegory, depicted by Fred Barnard. Left to right: The Man with the Muck-rake; Mr. Worldly Wiseman; Giant Despair



Pilgrims' Way. Conjectured routes followed by the pilgrims from Winchester to Becket's shrine at Canterbury, and of that taken by similar pilgrims from London, as described by Chaucer

Folk names, such as Beggars' Lane, Farthing Copse, and Pray Meadows, survive; and several churches along the Way, Seale, S. Martha's (properly S. Martyr's), and Gattton, were of pilgrim origin. The Way, which is doubled in places and in parts notable for its yew trees, followed a prehistoric track, strewn with many remains. With the exception of some 12 m. between Dartford and Strood, Chaucer's Pilgrims' Way, from London to Canterbury, 56 m., followed the modern Dover Road, touching Deptford, Dartford, Rochester, Chatham, Sittingbourne, Ospringe, and Harbledown. See Becket; Canterbury; Chaucer; consult also *The Canterbury Pilgrimages*, H. Snowden Ward, 1904; *The Old Road*, H. Belloc, new ed. 1911; *The Pilgrims' Way*, Julia Cartwright, new ed. 1911.

does not act as a structural support, e.g. a vertical monolith, or memorial column, such as Pompey's Pillar, Alexandria. The term is capable of application to any material welded together in rough columnar formation. Pillar saints, or Stylites, among whom S. Simeon Stylites is prominent, is a term sometimes used for hermits who made a home on the top of a pillar in the open air. A pillar-box is a receptacle in the street in which stamped letters can be placed.



Pillar in architecture

Pillars of Society, *THE*. Four-act play by Henrik Ibsen, published in 1877. The first of his dramatic indictments of modern society, it exposed the fraudulent hollowness of the conventional respectability upon which it is supported, but ends in a somewhat conventional note of repentance. The play was translated into English by William Archer.

Pillar-Worship. The ritual expression of reverence for natural pillar-shaped objects, especially of stone, and artificial upright structures of similar form. In the Mediterranean basin sacred pillars were erected by neolithic peoples, often in association with tree-worship (*q.v.*). Basalt pillars are venerated in negro Africa. See *Hermæ*; *Menhir*; *Obelisk*.

Pill-box. Popular name for a strong point, or machine-gun nest, as used by the Germans in the later stages of the Great War on the W. front. These defences usually consisted of a loopholed circular turret of thin armour plate, or a square concrete erection, containing men armed with machine guns.

Pillory (Old Fr. *pilori*, perhaps from Lat. *speculatorium*, a look-out). Instrument of punishment. It consisted of a post surmounted by a wooden frame with holes through which the head and hands of the culprit were thrust, and fastened to which he was exposed to public contumely for a specified time.

In England, where variations of the device were of old institution, the Statute of the Pillory, 1266, ordained its use as punishment for forestallers and regrators, users of false weights, perjurers, and forgers. After 1637 it became the usual punishment for press offences, such as printing books without licence and libelling the government, with results not always contemplated by the authorities: Daniel Defoe, for example, receiving a popular ovation when pilloried in July, 1703, for his famous plea for toleration. The Shortest Way with the Dissenters. In

Pilibhit. Dist. and town of the United Provinces, India, in the Rohilkhand division, adjacent to Nepal. Its area is 1,350 sq. m. The town is a rly. junction. Pop. dist.. 488,000; town, 31,600.

Pilekem. Village of Belgium, in the prov. of W. Flanders. It stands on a ridge of the same name, 80 ft. in height. Also known as Pilekem, the village is 1 m. E. of Boesinghe (*q.v.*), and was the scene of fierce fighting in the Ypres salient in the Great War, in which it was totally destroyed. The ridge, of supreme importance as dominating Ypres northwards, was captured by the Germans in the first battle of Ypres. Later regained, it was lost in the second battle and stormed, July 31, 1917, in the third battle. Recaptured by the Germans in April, 1918, it was recovered by the Allies in Sept., 1918. See *Ypres, Battles of*.

Pillar. In architecture, an irregular column, i.e. one not constructed in accordance with the proportions of the recognized orders. The term is loosely applied also to any disengaged column that



Pill-box. Strong point, or machine-gun nest, used by German troops in the Great War

1816 its use was restricted to punishment for perjury and subornation, perjurers being still liable to have their ears nailed to the pillory; and in 1837 it was abolished, having last been used, June 22, 1830, for the punishment of Peter James Bossy, convicted of perjury. The pillory was used in Germany, in France as late as 1840, and in the U.S.A. until 1839. See Torture.

Pillow. Cushion filled with feathers, down, or other soft material, chiefly used for resting the head on when in bed. In engineering, a pillow is the block or packing inserted under that part of the work which is subjected to weight, in order to equalise or distribute the pressure.

Pillow Lace. Lace made by hand with the aid of a straw-stuffed leather pillow. The design is traced upon parchment attached to the top of the pillow. Pins are inserted at the necessary points of the design, and the worker, using thread wound upon little bobbins, forms the pattern by twisting or plaiting two or more threads together. Pillow lace is made without any foundation of fabric, and is composed of twisted and plaited thread. See Lace.

Pillsbury, HARRY NELSON (1872-1906). American chess player. Born at Somerville, Mass.,

Dec. 5, 1872, he learned the game in Philadelphia and New York, and soon became famed as a player. In 1895, at Hastings, he won the world's championship, defeating Bird, Lasker, and

Steinitz. He won other championships and was an active player until his death, June 17, 1906.

Pillsbury, JOHN ELLIOTT (1846-1919). American sailor. Born Dec. 15, 1846, and entering the navy in 1867, he was in command of the dynamite cruiser Vesuvius off Santiago in the Spanish-American War, 1898. Occupied in coast survey for 10 years, he investigated the Gulf Stream currents, 1884-91. Chief of staff of the North Atlantic fleet in 1905, and chief of Bureau of Navigation, 1908-9, he retired in the latter year, dying Dec. 30, 1919.



Harry Pillsbury,
American chess
player
Russell



John E. Pillsbury,
American sailor



Pillory. Daniel Defoe standing in the pillory at Temple Bar, London. From the picture by E. Crowe

Pillwort or **PEPPER-GRASS** (*Pilularia globulifera*). Perennial herb of the natural order Marsileaceae. It is a native of Europe N. of the Alps. It is one of the water-ferns, but has a closer superficial resemblance to a delicate grass than to a fern. Its habitat is the margin of ponds and lakes, and ground that is inundated in winter. The creeping rootstock is a mere thread from which the slender bright green fronds unroll. The spores are produced in rough-coated globular capsules at the base of the fronds.

Pilocarpine. Alkaloid, a white crystalline powder, obtained from the leaves of jaborandi or *Pilocarpus microphyllus* and other species. It is used in medicine to stimulate sweating, particularly in Bright's disease.

Pilot. Person who navigates vessels. A licensed pilot is a person taken on board a vessel at any particular place for the purpose of conducting a ship through a river, road, or channel, or from or into a port, and, as regards the United Kingdom, is defined by the Merchant Shipping Act, 1894.

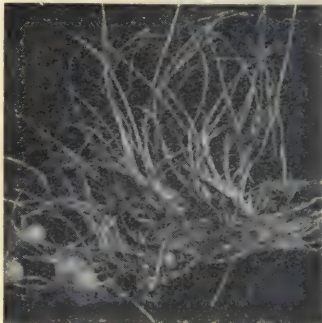
Pilots are licensed and controlled in various British ports by particular statutes and ancient charters of incorporation, as Trinity House, Cinque Port Pilots, and Trinity Houses of Hull and Newcastle, etc. In most cases it is obligatory upon a ship entering a port to take in a pilot, who has sole responsibility while in charge of the ship. The master or mate of a ship may be licensed as a pilot and bring the ship into port.

The licence of a pilot is issued by the chief officer of customs nearest to where the pilot lives, and the licence carries with it certain restrictions, e.g. a licensed pilot cannot have any interest in licensed premises.

The Merchant Shipping Act of 1906 ordained that in future no new pilot certificates for British

ports should be given to aliens, but aliens already holding certificates on June 1, 1906, were not deprived of them. In 1919 the subject of alien pilots again came before Parliament in connexion with the Aliens' Restriction Amendment bill, and French pilots may navigate vessels into the ports of New-haven and Grimsby See Navigation.

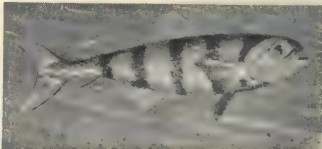
Pilot. In aeronautics, one qualified to control an aircraft in flight. There are certain recognized standard tests for pilots of aircraft. Thus the Fédération Aéronautique



Pillwort, showing to the left the globular spore capsules

Internationale, represented in Great Britain by the Royal Aero Club, has laid down tests for the pilots of free balloons, airships, and aeroplanes. Without having passed these tests no pilot is eligible for any sporting competition held under the auspices of the F.A.I. or any of its associated bodies. Under the Aerial Navigation Acts no pilot may fly outside the confines of an aerodrome without passing tests similar to, but somewhat extended from, those laid down by the F.A.I. See Air Force, Royal; Airmanship.

Pilot Fish (*Naukrates ductor*). Marine fish, nearly related to the horse mackerel. It is about a foot



Pilot Fish. Marine fish related to the horse mackerel

long and of a bluish colour with dark transverse stripes. It is common in the tropic seas and often

accompanies ships, whence arose the old notion that it acted as a pilot and indicated the proximity of land. It also frequents the company of sharks.

Pilot Officer. Designation in the Royal Air Force of the lowest rank of commissioned officer.

Pilot Snake. Harmless N. American reptile. Common in the middle states of the U.S.A., it is black or dark brown above, spotted with darker shades. It is a little lighter shade underneath. The snake is remarkable for its extraordinary quietness when captured and the ease with which it can be tamed. It lives chiefly in the forests, and feeds chiefly on birds, mice, and other small animals. The name is also given to the copperhead and fox snakes. See Snake.

Piloty, KARL THEODOR VON (1826-86). German painter. Born at Munich, Oct. 1, 1826, he studied

at the Munich Academy, under C. Schorn. On his return to Munich after a journey abroad he painted in 1854 for the Maximilianeum a picture of the Elector Maximilian adhering



Karl von Piloty,
German painter

to the Catholic League in 1609. This work established him as a historical painter of the new realistic school, and he became a professor of the Munich Academy. His *Murder of Wallenstein*, 1864, is a good example of his treatment. Piloty died July 21, 1886. His brother, Ferdinand (1828-95), studied under Schorn at the Munich Academy, and afterwards was greatly influenced by Karl. He painted a series of historical frescoes in the National Museum, Munich, the town hall at Landsberg, etc. He is also well known as an illustrator of the works of Shakespeare and Schiller. *Pron. Piloh-ty.*

Pilsen or **PLZEN.** Town of Czecho-Slovakia, in Bohemia. It is 52 m. W.S.W. of Prague at the confluence of the Mies and Radbusa and is an important rly. junction. S. Bartholomew's, a 13th century edifice, has a notable spire 335 ft. high. The Renaissance town hall contains the banqueting hall where Wallenstein received the oath of fealty from his generals. Pilsner lager is brewed in the municipal brewery. The first printing press in Bohemia was established in Pilsen. Near here is Skoda (*q.v.*). Pop. 81,000. See Czecho-Slovakia.

Pilsudski, JOSEPH (b. 1867). Polish soldier and statesman. Of Lithuanian descent, he was born,

Dec. 5, 1867, at Zulov, Vilna province, and early showed himself an intensely patriotic Pole. In 1887 he was arrested by Russia, and spent five years in exile in Siberia, returning whence to Poland, he became the leader of the Nationalist Socialist party. From 1894 to 1900 he edited *The Worker*, a clandestine paper, and this led to his arrest and imprisonment. Escaping in 1901, he made his way to England, but 1902 found him again in Poland.



Joseph Pilsudski,
Polish soldier

When the Great War broke out he appeared as general of a Polish legion which invaded Russia on Aug. 6, 1914. After the Austro-German conquest of Russian Poland, he was made a member of the Polish council of state in Nov., 1916, but soon resigned. The Central Powers thereupon caused him to be arrested on July 21, 1917. He was liberated in Nov., 1918, and returning to Poland, was entrusted with the powers of the council of regency. Governing for a while as dictator, he was elected president of Poland, Feb. 20, 1919, and later was given the rank of marshal. In Dec., 1922, he resigned the presidency. See *La Pologne Nouvelle* et son premier chef d'état, Stanislas Szpotenski, Paris, 1920.

Piltown Skull. Fossil bones of the oldest known European race with distinct human traits. They were discovered by Charles Dawson (d. 1916) in quaternary gravels at Pilt Down, Sussex, from 1912 onwards. The human skull and ape-like jaw, if belonging to the same individual, suggest that mental development preceded the disuse of prehuman methods of employing the teeth as weapons. See Anthropology; Eoanthropus; Man.

Pima. American Indian tribe in the U.S.A. and Mexico. They numbered in 1910, in U.S.A., 4,236, mostly in Arizona; in Mexico 7,468, including Cora and Nevome or lower Pima, mostly in Vera Cruz and Tepic.

They are one of the leading tribes of Piman stock, the important group which occupies nearly the whole of the W. coast and Sierra Madre region of Mexico and Arizona from the Gila river S. into Jalisco. They are agricultural, and were driven out of their original homes from the middle Gila to Sonora, Mexico, by hostile tribes. In 1751 they revolted under

their chief Don Luis and destroyed all Spanish missions and settlements in their country. The women are noted for their pottery and water-tight woven baskets. They are now chiefly collected on the Gila river and Salt river reservations, Arizona. See Sonoran; American Indians.

Pimento (Sp. *pimiento*). Genus of tropical American trees belonging to the order Myrtaceae. They bear cymes of small flowers and coriaceous leaves. The chief species are *Pimenta officinalis*, the pimento bush, and *P. acris*, the wild clove or black cinnamon tree. The chief use of pimento is as a spice. The oil is used in medicine in the same way as cloves, and in perfumery. The well-known bayrum toilet requisite is sometimes scented with *P. acris*. See Allspice; Cinnamon; Pepper.

Pimlico. Dist. of London. It lies between the Thames, E. and S., Chelsea, W., and Belgravia and Victoria St., Westminster, N. It includes Victoria stations of the S.E. & C. and L.B. & S.C. Rlys. Pimlico Road links the Royal Hospital Road with Buckingham Palace Road. First mentioned in the early part of the 17th century and notable for its ales, Pimlico is said to derive its name from a house of popular resort resembling one of the same name at Hoxton, called after its Italian proprietor. Hoxton still has a Pimlico Walk, and a public garden at Bankside, Southwark, was known as Pimlico Garden. See London.

Pimpernel (Med. Lat. *pipinella*) or POOR MAN'S WEATHER-GLASS (*Anagallis arvensis*). Annual herb of the natural order Primulaceae. It is a native of Europe, Asia, and N. Africa. The slender square stem mostly lies along the ground, the branches more erect. The opposite, stalkless leaves are oval or lance-shaped. The bright scarlet flowers open only in the earlier part of the day, and in clear weather. The fruit is a globular



Pimpernel. Leaves, stalks, and flowers of the familiar scarlet pimpernel

capsule containing many three-sided seeds. A variety has the flowers bright blue.

Pin. Device for fastening objects together, usually textile fabrics. The most usual form of pin consists of a short length of wire pointed at one end and with a head at the other.

The earliest forms of pins were made of bone or bronze, and specimens of these are found in Egyptian and Roman remains. Pins of iron wire were made in England in the 15th century, but the greater part of the pin trade was in the hands of France till the 17th century, when their manufacture was taken up in London, Birmingham, and other places. The pins were all hand made, a length of wire being filed to a point, and the head made by twisting a piece of fine wire round the other end. Solid-headed pins were introduced in 1797, the head being moulded, and between that date and 1838 various patents were taken out in Great Britain and the U.S.A., leading to the modern method of pin-making.

Iron, steel, and brass wire are used in modern pins. A cutter cuts off correct lengths from a reel of wire in the pin-making machine, the blank is held by a pair of nippers while the head is punched, the points ground by moving the pin across a circular file revolving at high speed, and the completed pin then falls into the receiving pans. The whole operation is automatic, the only attention the machine requires being the renewal of the reel of wire. Two to four hundred pins a minute are made by each machine. The pin sticking machine holds the pins in rows by their heads, and presses them into crinkled paper.

Safety pins are made on automatic machines which are fed with a continuous strip of metal on the one hand, and with pointed stems on the other. From the strip blanks are cut and these blanks are passed, one at a time, from tool to tool until, as formed caps, they lie in succession under the fastening tools. In a hopper where the pointed stems have been placed in bulk, a single stem is separated, raised, and carried by a mechanism almost human in its action, to tools which form the head and the coil. These operations completed, the coiled stem is lifted away and pushed head and point into the cap lying beneath the fastening tools. The cap is pressed on to the head, and the completely formed pin thrown out of the machine. Black pins are japanned by immersion in black enamel.

In engineering, a pin is a short length of wire or metal rod for holding various parts of machinery together or preventing them from slipping. A split pin is one in which the shank is divided, so that each end can be bent and the pin prevented from falling out of the hole in which it is inserted. See Pins and Pincushions, E. C. Longman and S. Loch, 1911.

Pina Cloth. Yellowish lawn fabric woven from the leaf fibre of the pineapple plant and allied species. It is made chiefly in the Philippine Islands, and is used for handkerchiefs, scarves, etc. In spite of its delicate appearance it is very strong.

Pinafore, H.M.S. Comic opera written by W. S. Gilbert, with music by Arthur Sullivan. It was produced at the Opéra Comique, London, May 27, 1878, attaining a run of 700 performances. The original cast included George Grossmith, Rutland Barrington, George Power, and Jessie Bond.

Pinar del Rio. Province and town of Cuba. The prov., which has an area of 5,212 sq. m., and a pop. of 270,000, produces tobacco, sugar, coffee, and fruit, and has lumber and cattle-rearing industries. On the S. slope of the Cordillera de los Organos is the Vuelta Abajo, where is grown the finest tobacco in the world. The town, the capital of the prov., is situated 93 m. W. by S. of Havana, with which it communicates by rly. Pop. 10,600.

Pinch, Tom. Character in Dickens's novel *Martin Chuzzlewit*. A man of thirty, modest, open-hearted, and guileless, plain and ungainly in person, he acts as assistant to Mr. Pecksniff,



Tom Pinch, the guileless character in *Martin Chuzzlewit*, in a reverie at the organ. From a drawing by Fred Barnard

whose assumption of piety and benevolence completely deludes him. Discovering eventually his master's hypocrisy, he comes to London, where he is engaged as librarian by an unknown benefactor, later discovered to be old Martin Chuzzlewit. Ruth Pinch, Tom's sister, a dainty and captivating girl, acts as her brother's housekeeper until she marries his friend, John Westlock.

Pinchbeck. Variety of brass. It was named after Christopher Pinchbeck (d. 1732), a London clockmaker, who is said to have discovered it, although there is no contemporary mention of the fact. His son, another Christopher Pinchbeck (d. 1783), was also a clockmaker who had a number of mechanical inventions to his credit.

The best pinchbeck is obtained by an alloy of copper 89 p.c. and zinc 11 p.c. to 93 copper and 7 zinc. Pinchbeck was at one time largely used for the manufacture of cheap jewelry and watch-cases, but has now given way almost entirely to what are known as gold-filled products.

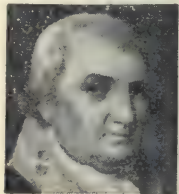
Pinchot, GIFFORD (b. 1865). American forestry expert. Born Aug. 11, 1865, he graduated at



Gifford Pinchot, U.S. forestry expert

Yale, studied forestry in Europe, and in 1893 became a consulting forester. Entering government service, he was chief of the forestry department, 1898-1910, when he was dismissed by President Taft for insubordination in having criticised a presidential decision which had gone against his department. Later he founded the School of Forestry at Yale. He wrote several technical works, including *The White Pine*, 1896; *The Timber Trees and Forests of North Carolina*, 1897; and *Primer of Forestry*, 1899.

Pinckney, CHARLES COTESWORTH (1746-1825). American statesman. Born at Charleston, S. Carolina, Feb. 25, 1746, he was educated in England at Westminster School and Christ Church, Oxford, studied law at the Middle Temple, and afterwards practised in his native town. After serving in the



C. C. Pinckney, American statesman

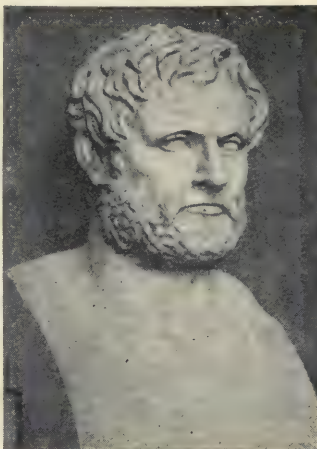
War of Independence, he took part in the Constitutional Convention in 1787, and was responsible for the clause abolishing religious tests as a qualification for office. He was one of the special envoys to France in what became known as the X Y Z mission. Pinckney was a supporter of slavery, a strong Federalist, and twice an unsuccessful candidate for the Presidency. He died at Charleston, August 16, 1825.

Pindar (c. 522–443 B.C.). Greek lyric poet. He was born of a noble Dorian family, near Thebes, in Boeotia. The traditions of the family were musical, and Pindar is believed to have excelled in flute playing. His first poetical composition was a choral ode, written at the age of 20 in celebration of the victory of a Thessalian youth at the Pythian games. He rose rapidly to fame, receiving commissions to write choral songs for special occasions from all parts of the Greek world, from democracies such as Athens and from tyrants such as Hiero of Syracuse in Sicily. He came to be regarded as the great national lyric poet of Greece, and after his death his memory was held in the utmost veneration. When the Spartans destroyed Thebes in the Peloponnesian War, the house of Pindar was spared, and the same honour was paid to his memory by Alexander when Thebes was again destroyed by the Macedonians.

Pindar wrote lyrics of many forms, including hymns to the gods, dancing songs, carnival songs, and dirges; but, except for fragments, all that have survived are his *epinikia*, or odes written in celebration of victories at the great national games of Greece. These are divided into four books according as the victories celebrated were at the Olympian, Pythian, Nemean, or Isthmian games. Not only is the language of the odes epic (with an admixture of Doric and Aeolic), but there is a background of epic legend. Not infrequently the poet endeavours to inculcate a moral lesson.

Much of the beauty of the odes is lost because the modern reader cannot hear them in the magnificent setting of the festivals at which they were chanted. Yet even in the cold text the wonderful radiance and dazzling rapidity of Pindar remain. The metres, though to an untrained eye apparently irregular, conform to a definite system of prosody. The so-called Pindarics of Cowley, Dryden, and other lesser poets are prosodic absurdities, composed in ignorance of the fact that the Greek lyricists

odes were built up on a precise and accurate system. There is an excellent translation, with parallel text, by Sir J. E. Sandys in the Loeb Classical Library, 1915. See Greek Literature: Ode; consult also Pindar, F. D. Morice, 1879; History of Ancient Greek Literature, G. Murray, 3rd ed. 1902.



Pindar, the greatest lyric poet of ancient Greece

From a bust in Villa Albani, Rome

Pindar, PETER. Pseudonym of John Wolcot (1738–1819). British satirist. He was born at



Peter Pindar, British satirist

born at Dodbroke, in Devonshire, and having qualified in medicine went to Jamaica, and became physician-general of the island. Returning to England in 1773, he set up in practice in Cornwall, where his ideas of treatment scandalised his orthodox medical brethren, specially his remark that a physician could do little more than watch nature and "give her a shove on the back if he sees her inclined to do right." In 1781 he gave up practice and came to London, where his satires and lampoons, witty but brutal and sometimes profane, on the Royal Academy, on royalty, and on other subjects, brought him great fame, though they are now completely forgotten, except for a few pointed apophthegms. Wolcot died Jan. 14, 1819.

Pindaris. Body of brigands and freebooters of all nations and religions of India. They carried on pillaging and marauding expeditions from headquarters in the Vindhya Hills, and in the opening years of the 19th century had become the

scourge of Central India. A Pindari invasion of the British possessions in the Deccan in 1815 brought matters to a head, and the forces of Hastings, the governor-general, surrounded the Pindari district in 1817, and crushed the brigand power.

Pind Dadan Khan. Town of the Punjab, India, in Jhelum dist. Situated 5 m. from the Salt Range and 1 m. from the Jhelum, it was founded in 1623 by Dadan Khan, and has considerable local trade, especially in salt. Pop. 10,600

Pindemonte, IPPOLITO (1753–1828). Italian poet. Born at Verona, he was educated at Modena, and at the age of 24 went to Rome, where he became a member of the Arcadian Academy. As such, he undertook a translation of the Odyssey, and to prepare himself for this work he visited the various places associated with the legend of Ulysses. Having published a volume of poems in classic form, *Poesie Campestri*, in 1788, he travelled in Germany, France, and England. In 1807 he published a fine poem in reply to Ugo Foscolo's *Sepolcri*, with the same title. His translation of the Odyssey into Italian blank verse was finally completed in 1822. He died at Verona, Nov. 18, 1828.

Pindus. Mt. range of N.W. Greece. Once the boundary between Epirus and Thessaly, it is the continuation S. of the Albanian Mountains and culminates in Veluchi, 7,600 ft.

Pine (*Pinus*). Genus of about 70 species of large evergreen trees of the natural order Coniferae, natives chiefly of the N. temperate regions and the mountains of the N. tropics. The branches form whorls, each whorl marking a season's growth. The lower branches are killed off by the upper ones depriving them of light. The evergreen leaves are needle-shaped, produced in clusters of two to five. The flowers are simple, without sepals or petals, and the males and females are on separate branches. The males are clustered in spikes at the base of new shoots and consist merely of scale-like stamens, each with two anther-bags filled with sulphur-coloured powdery pollen. The females are found near the tips of shoots in the form of round, scaly cones, each scale bearing a couple of seed eggs. After fertilisation by wind-borne pollen these develop into the hard woody pinecones, in which the seeds do not ripen until the second or third year after their fertilisation.

For the production of the valuable soft timber (deal), pines are grown crowded together, in order to



Pine. 1. Cluster pine. 2. Young cone of cluster pine. 3. Scotch pine. 4. Young cones of Scotch pine. 5. Cones of Austrian pine. 6. Austrian pine

discourage branch growth and increase the length and girth of the

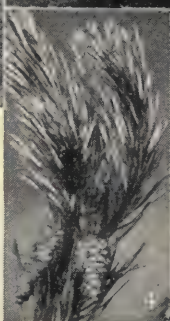
trunk. The Scotch pine (*P. sylvestris*) of Europe and N. Asia is the only British species. It reproduces itself by self-sown seed on heaths and wastes, however poor the soil. Its growth in Britain is more rapid than in the N. of the Continent, and as a consequence the timber is coarse-grained and less durable than that imported from the Baltic region. It abounds in turpentine, and yields tar, pitch, and resin.

Other species of pine introduced and commonly grown in Britain include the Corsican P. (*P. laricio*) from Central and S. Europe, the Cluster P. (*P. pinaster*) from the Mediterranean region, and the Weymouth P. (*P. strobus*) from N. America. Others occur as ornamental trees in parks and large gardens. Pine timber is always in good demand, as it is the general utility wood of the builder for joists, flooring, doors, stairs, window-frames, etc., as well as for the ordinary purposes of the carpenter. Most of the exotic species may be reared easily from seed, and as they are mostly accustomed to grow naturally in poor or shallow soils, they

will thrive in most gardens. The best results are attained by sowing them where they are to remain as trees. See Coniferae; Forestry.

Pineal Gland (Fr. *pinéal*, like a pine-cone). Small body deeply situated in the brain. It is believed to represent morphologically the traces of a third eye, and in certain lizards part of the gland becomes developed into a structure resembling an eye, but covered with skin. Modern researches indicate that it may be a gland, the secretions of which are supposed to influence, particularly in early life, both the mental and physical growth.

Pineapple (*Ananas sativus*). Perennial herb of the natural order Bromeliaceae, native of S. America. From the rootstock grows a cluster of long, thin-textured, but rigid sword-shaped leaves with sharp-toothed edges. From the centre of the leaf-cluster rises a short stout stem ending in a conical spike of



flowers surmounted by a crown of small, spiny leaves. The berries succeeding the flowers grow together into a juicy compound fruit—the pineapple. The plant was introduced to Europe in the 17th century, and grown in stove-houses, where fine fruit was often produced; but its extensive field cultivation in the W. Indies and the Azores supplied the markets with



Pineapple. Fruit arising from leaf cluster

an abundance of fine fruit, which has led to the gradual abandonment of stove cultivation.

Pineapples should be grown in pots in a hothouse, should be placed in a sunny position, and the pots plunged into a hotbed at a temperature from 65° to 75° F. The soil should consist of a thoroughly mixed compost of loam, well-decayed manure, and a little lime, or crushed bones or oyster shells. When established, the temperature may be allowed to drop 10° during the winter months. Water should be given freely in summer time, when the temperature should be brought up to 80° to 90°, but very sparingly during autumn and winter. With proper care, a pineapple stock will yield a ripe fruit every eight months for a number of years. See Australia; Hawaiian Islands.

Pine Bluff. City of Arkansas, U.S.A., the co. seat of Jefferson co. It stands on the S. bank of the Arkansas river, 44 m. by rly. S.S.E. of Little Rock, and is served by the St. Louis, South-Western, and other rlys. Among its educational institutions is the Merrill Institute. Manufactures include cotton, cotton-seed oil, foundry and machine-shop products, boilers, and furniture. Pine Bluff was organized in 1832, and became a city in 1885. Pop. 19,300.

Pine Creek. Name of many streams and small towns in U.S.A. In Pennsylvania one of these streams is a tributary of the Susquehanna, 100 m. in length. In Alaska and in the Yukon dist. of Canada there are such streams whence gold is obtained. In the Northern Territory of Australia, Pine Creek is 146 m. S.E. of Darwin; the rly. from the latter port has been extended 60 m. S.E. of Pine Creek to Katherine.

Pinega. River of N. Russia. It rises in the govt. of Vologda, flows generally N.W. through that of Archangel, and discharges itself into the Northern Dvina, near Kholmogory. Its length is 350 m.

Pinel, PHILIPPE (1745-1826). French physician. Born at Saint-André, Tarn, April 20, 1745, he was educated at the university of Toulouse. He studied medicine and, after having written a treatise on mental disease, became a lecturer and then a professor at a medical school in Paris, and chief physician at important hospitals there. Pinel, who did a great deal to secure more rational and humane treatment for lunatics, died in Paris, Oct. 26, 1826.

Pinene. Hydrocarbon of the terpene group. It is the chief constituent of oils distilled from

resinous excretions of pine trees, as turpentine. Pinene is a colourless liquid, which on keeping becomes resinified through the absorption of oxygen from the air. When hydrochloric acid gas is passed into pinene, the hydrochloride known as artificial camphor is formed.

Pinero, SIR ARTHUR WING (b. 1855). British dramatist. Born in London, May 24, 1855, the son of a solicitor, he was an actor from 1874 until 1881, when he took to writing for the stage. After some preliminary success, notably with *The Squire*, 1881, and *The Magistrate*, 1885, he produced a series of brilliant comedies at the Court Theatre, 1885-93, a charming comedy of sentiment, *Sweet Lavender*, 1888, and the dramatic play,



Hoppt

Arthur Wing Pinero.

The Profligate, 1889. He secured his place as the foremost living British dramatist with *The Second Mrs. Tanqueray*, 1893. Later plays include *The Notorious Mrs. Ebb-smith*, 1895; *Trelawney of the Wells*, 1898; *The Gay Lord Quex*, 1899; *His House in Order*, 1906; *Mid-Channel*, 1909; *The "Mind the Paint" Girl*, 1912; *The Big Drum*, 1915; *Mr. Livermore's Dream*, 1917. Pinero was knighted in 1909. Pron. Pin-ay-ro.

Pinerolo. City of Italy, in the prov. of Turin. It stands on the river Chisone, at the foot of the Alps, 24 m. by rly. S.W. of Turin. The chief buildings are the cathe-

dral, dedicated to S. Donatus, and the palace, the successor of the famous castle. The city has manufactures of textiles, leather, paper, etc. Pinerolo was at one time one of the strongest places in Italy. It grew up around a castle which about 1190 was taken by the count of Savoy. A later count made it his capital and it remained a possession of the house of Savoy, save for short periods when it was in French hands. During one of these periods, early in the 17th century, the French greatly improved the fortifications. The castle is notable because in it Fouquet and the man in the iron mask were imprisoned. Pop. 18,000.

Pinfold. Enclosure, or pound, in which strayed cattle are placed. See Pound.

Ping-pong or TABLE TENNIS.

Indoor form of lawn tennis. It was played on a table not less than 5½ ft. by 3 ft. About 1900-2 the game had a great vogue in England, and the Ping-Pong Association and the Table Tennis Association were formed. The regulation size of the table was fixed at 9 ft. by 5 ft., with a net about 7 ins. high, the balls being of thick celluloid, ¾ of an inch in diameter, and seamless. The surface of the table was generally of composition, stained black or dark green, with a painted white line round the edge. The game was first played with a battledore, then a racquet with springs was tried, and then a wooden bat, more or less of the shape of a tennis racquet, and covered with rubber or glass paper. Later a plain wooden bat was used.

The counting could be done according to lawn tennis or racquet scoring. In a third method each



Ping-pong or Table Tennis. Table adapted for the game, showing arrangement of net and position of players

player served 5 times in turn, and the game was 25 up. The server had to make the ball hit the table on his own side of the net, whence it had to bounce into the opponent's court. Volleying was not allowed either in the return of service or rally—otherwise the rally was played just as lawn tennis. A single or double could be contested, or one player against two, but a single was the most usual and the best game. The most effective stroke was a form of back-hand half-volley, and good players used this almost to the exclusion of all other strokes.

Pinguicula (Lat. *pinguis*, fat). Genus of perennial insectivorous herbs of the natural order Lenticulariaceae. They are natives of the N. temperate regions, the Andes, and the Antarctic zone. Four species are natives of Britain, where they are known as Butterworts (*q.v.*).

Ping-yang. Town and open port of Korea. The capital of South Heian prov., it stands on the

metal or material is provided between the ends of the teeth, so that in side elevation the wheel appears circular, a pinion is said to be shrouded. The word is also used for any small wheel having teeth which gear with others on a larger wheel or piece of mechanism.

Pink (*Dianthus plumarius*). Tufted perennial herb of the natural order Caryophyllaceae. It is a native of Mid. and E. Europe, whence it was introduced to Britain in 1629. It has become naturalised on old walls in many places. It has slender, rounded, branching stems, 1 ft. high, swollen where the grass-like, glaucous leaves are given off in pairs. The rose-purple fragrant flowers have fringed petals.

Under cultivation it has given rise to numerous varieties, single and double, pure white, or variously spotted and variegated, which are classed as show or laced pinks, and border pinks. They succeed best in rich loam, to which for the pro-

duction of fine flowers decomposed manure and leaf-mould are added. They are propagated by seeds and cuttings (pipings). The latter are taken in summer from the side-shoots, cleanly cut just below a leaf-joint. The lower leaves are removed carefully, and the pipings inserted in

sandy soil in the shade. Large clumps may be divided and replanted in Sept.

Pink Dominos, THE. Farceical comedy adapted, by James Albery, from Les Dominos Roses of MM. Hennequin and Delacour. It was produced at the Criterion Theatre, London, March 31, 1877, attaining a run of 155 continuous performances. The comedy tells how two wives seek to test the marital fidelity of their husbands, originally played by Charles Wyndham and Herbert Standing, by sending them invitations to a masked ball.

Pinkerton, ALLAN (1819-84). American detective. Born in Glasgow, Scotland, Aug. 25, 1819, he emigrated to America in 1842, and immediately opened a detective agency in Chicago. In 1861 he was appointed to guard President Lincoln, and in the same year he inaugurated the Federal Secret Service. He organized a band of men to protect employers against strike riots, and took a leading part in suppressing the Molly Maguires

(*q.v.*). The agency formed by him was responsible for the solution of many sensational criminal cases, and under his sons, Robert Allan and William Allan, the agency became world-famous. See The Molly Maguires and the Detectives, 1877; Criminal Reminiscences, 1878; Thirty Years a Detective, 1884, all by Allan Pinkerton.

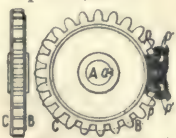
Pinkerton, JOHN (1758-1826). Scottish historian. Born in Edinburgh, Feb. 17, 1758, he was trained for the law. His interests, however, were literary, and, having settled in Edinburgh, he collected and published some volumes of ballads. From that he turned to antiquarian and historical studies, which culminated in his History of Scotland, 1797. His other works include an Essay on Medals, 1784; a Scottish Biographical Dictionary, 1799; and a Modern Geography. He died March 10, 1826, and his Literary Correspondence was published in 1830.

Pink Eye. Term for horse influenza, first used in America. The first symptom of the disease is a red and swollen condition of the membranes of the eye. See Horse.



Ping-yang. Characteristic street scene in the Korean port

Ta-tong or Tai-dong, about 35 m. from its embouchure into Korea Bay, and is connected by rly. with Chinnampo, its outpost. It carries on an active foreign trade, is the centre of an important silk industry, and provides labour for the working of neighbouring coal mines. The river is navigable to Ping-yang by small craft only; medium draught vessels ascend only to about 12 m. lower down. The town was the scene of a Chinese victory over the Japanese in 1592, and the defeat of the Chinese by the Japanese in 1894. Pop. 175,500.



Pinion. Commonly, a small spur- or cog-wheel which gears with a larger wheel, or a toothed rack. When, to give additional strength, a thickness of



Pink. Flowers of the sweet-smelling garden plant

Pinkie, BATTLE OF. Fought Sept. 10, 1547, between the English and the Scots. Somerset, the English Protector, wished to unite the two countries by a marriage between Edward VI and Mary, and proposed a treaty to the Scots, which was refused. Somerset crossed the border with some 16,000 men and met a Scottish army, about 23,000 strong, drawn up behind the Esk, at Pinkie, near Musselburgh. The Scots crossed the river to seize some hills on the English left and won an early success. The English foot, however, with whom were some Italian musketeers, did deadly work and the Scots were soon routed. Some 6,000 of them are said to have been killed.

Pinking. Cutting of eyelets or scallops in cloth. Fabrics for coffin linings are often pinked, and it was

common at one time for private dressmakers to send material to the undertaker's to be pinked by the aid of the cutting tools kept by these tradesmen. Laundry pinking implies a special kind of ironing whereby broad frills such as are often seen on pillow-cases are neatly crimped. The iron employed for the purpose has a curved surface.

Pink Root (*Spigelia marilandica*), WORM GRASS, OR INDIAN PINK. Perennial herb of the natural order Loganiaceae. A native of N. America, the opposite, oval lance-shaped leaves are stalkless.



Pink Root. Leaves and funnel-shaped flowers. Inset, enlargement of flower

The funnel-shaped flowers are red outside and yellow within, grouped on a one-sided spike. The leaves and roots yield spigeline, a powerful worm medicine.



Pinnace. Steam pinnace used in the British navy
Cribb, Southsea

Pinnace. One of a warship's boats. It may be propelled by oars, sail, steam, or motor. Most pinnaces are motor-driven. When oars alone are used, a pinnace is generally eight-oared and double-banked. The term applies to a light sailing-boat, frequently schooner-rigged, used as a tender to a much larger vessel. Sailing pinnaces often relied upon oars when the wind fell.

Pinner. Parish and village of Middlesex, England. It is 13 m. N.W. of London, on the L. & N.W. Met., and G.C. Rlys., and on the Pina, a feeder of the Colne. The cruciform flint and stone church of



Pinking, or scalloping, cut in edge of cloth material

S. John the Baptist, built on an earlier foundation in 1321, and restored 1879, has a fine Perpendicular tower, and a mural monument to the poet laureate, Henry J.

Pye. Zephaniah Holwell, a survivor of the Black Hole of Calcutta, lived at Pinner Place. In a cottage in Pinner Wood, Bulwer-Lytton wrote Eugene Aram. Pinner Park, once forest land in the keeping of the abbots of Westminster, passed to S. Thomas's Hospital, London. Near to the L. & N.W. Rly. station are the Commercial Travellers' Schools, opened 1855. The Queen's Head inn dates from 1705. At Headstone was a residence of the archbishops of Canterbury. Once a hamlet and chapelry of Harrow, Pinner was, by Edward III, granted a market, long discontinued, but once of importance. Pop.

7,000.

Pinos, ISLA DE, OR ISLE OF PINES. Island in the West Indies. It lies about 36 m. S. of Cuba, of which it is a dependency, and has an area of 845 sq. m. Pine-apples and tobacco are grown. Cattle rearing is carried chiefly sulphur

soap works, and tanneries for preparing Russian leather. In the 15th century it belonged to the princes of Kiev, then became independent, and after belonging to Lithuania and Poland, passed to Russia in 1795. Pop. 39,000.

After their withdrawal from Brest-Litovsk, on Aug. 25, 1915, the Russians under Evarts fell back towards Pinsk by the rly. due E., and towards Minsk by the rly. running N.E., pursued along the former line by Mackensen, and along the latter by Prince Leopold



Pinner, Middlesex. Parish church of S. John the Baptist

of Bavaria. Evarts's right wing retired behind the Zelianka, a tributary of the Niemen. Higher up, on the Bialystok-Baranovitchi rly., the Germans took Volkovysk, W. of the Zelianka, on Sept. 7, and then swung S. towards Rozany, about 10 m. above Kartuzkaia, Bereza.

Leopold then turned his attention to Baranovitchi, but after stiff fighting he was repulsed, and held on a line from Novo Grodek to a point E. of Pinsk about the end of Sept., by which time Pinsk had been in Mackensen's hands for a fortnight. Marching along the rly. Mackensen, on Sept. 7, had reached Drohichyn, some 70 m. from Brest-Litovsk and 34 m. from Pinsk. After fighting with Evarts's rearguards a heavy action at Janoff, he occupied Pinsk on Sept. 16, the Russians having eluded capture; on Sept. 23 he was beaten



Pinsk, Russia. View from bridge over the river Pina showing the convent

in an engagement E. of Pinsk. The town was occupied by the Poles and recovered by the Bolsheviks during the fighting between them in 1920.

Pint. Measure of capacity. The English pint is both a liquid and a dry measure, is the eighth part of an imperial gallon, and contains 34.65925 cubic inches. The pint is subdivided into four gills, and two pints make a quart. The Scottish pint contains a little over three imperial pints, and the U.S.A. standard pint 28.875 cubic inches. In medicine a pint is equivalent to twenty fluid ounces. *See* Weights and Measures.

Pintail Duck (*Dafila acuta*). Wild duck, widely distributed over the N. hemisphere and a



Pintail Duck. A winter migrant to Britain

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winter migrant to British shores. It breeds in Scotland and the islands adjacent. Locally known as the sea-pheasant, it is easily recognized by its slender and graceful form, and long, pointed tail. It occurs in small flocks near the shore and feeds upon weeds, crustaceans, and insects.

Pintle. Pin or hook by which a rudder is attached to the stern-post of a ship. The similar pin used for hinges of any kind is often known as a pintle.

Pinturicchio, BERNARDINO (1454-1513). Italian painter. Born at Perugia, he studied under Fiorenzo di Lorenzo, and worked in the Sistine Chapel, Rome, 1482. He subsequently visited Orvieto, Perugia, Spoleto, and Milan. At Siena he painted the Life of Aeneas Silvius (Pope Pius II) in the library. The Sistine Chapel and Borgia frescoes at the Vatican were his most successful works. His art deteriorated before his death, which took place at Siena, Dec. 11, 1513. *See* Alexander VI; Ceiling.

Pinwell, GEORGE JOHN (1842-75). British painter and illustrator. Born in London, Dec. 26, 1842, he studied at the St. Martin's Lane Academy and Heatherley's. He was elected A.R.W.S. in 1869, R.W.S. in 1870, and contributed many water-colours to the society's exhibitions; but he is best remembered by his black and white work in *Once a Week*, *Good Words*,



George Pinwell, British painter

Pinxton. Market town of Derbyshire, England. It is 6 m. from Mansfield, and is served by the G.N., Mid., and G.C. Rlys. Lace is made here, and there are large coal mines in the neighbourhood. It has a very old church. Market day, Fri. Pop. 5,000.

Pinzon, VICENTE YAÑEZ (c. 1460-c. 1524). Spanish navigator. Born at Palos, he became a skilful mariner and commanded the *Nina* on Columbus's first voyage to America. In 1497 he reached the American mainland, and in 1499 discovered the coast of Brazil and the mouth of the Amazon. In 1505 he was made governor of Porto Rico. He went to sea again in 1508, however, and returned to Spain the following year with gold.

Piombi (Ital., leads). Name given to a state prison in Venice. It is so called from being situated beneath the lead roof of the Doge's Palace, and the attic cells were used mostly for state prisoners. Of the inmates, G. J. Casanova and Silvio Pellico (*q.v.*) are the best known. *See* Venice.

Piombino. Former independent principality of N.W. Italy, now included in the prov. of Pisa. Its area is 138 sq. m. Originally an imperial fief, it belonged from 1399 to 1603 to the Appiani family. It was taken by the French in 1801, and was given by Napoleon to his sister, the wife of Prince Bacciocchi. In 1815 it passed to Tuscany and thus to Italy. The most interesting town in the old prov. is Populonia, the Etruscan Pipluna. Situated on a hill, the town is dominated by a mediaeval castle. It was an important port in Roman times when the iron from Elba was smelted there. *Pron.* Peom-beeno.

Piombino. Town and seaport of Italy, in the prov. of Pisa. Situated on a promontory opposite the island of Elba, 8 m. by rly. S.W. of Campiglia Marittima, it is the port of embarkation for Elba. It has iron-rolling mills. Pop. 8,000.

Pioneer (Fr. *pionnier*, foot soldier, sapper). Word used for soldiers who prepared the way for the march of an army. They did this by clearing and making roads, and their duties included also the preparing of entrenchments and

and other journals associated with the revival of English illustration in the 'sixties. He died at South Hampstead, Sept. 8, 1875. *See* **Pied Piper**.

bivouacs. From this use it came to mean one who was first in any work of discovery, whether actually, as in unexplored forests, or figuratively, as a scientist.

In the British army a pioneer battalion is a body of troops who prepare positions, lines of communication, and defensive works for the use of combatant units, and thus relieve the latter of the fatigue and time involved in such work. Pioneer battalions were part of the establishment of most Continental armies, but it was not until the Great War that they became indispensable to the British Service. They were mainly recruited from the navy class.

Pioneer, THE. Anglo-Indian daily newspaper published at Allahabad. It was established in 1865, and devoted particularly to the interests of the civil and military services. The *Pioneer Mail* and *Indian Weekly News*, issued from the same office and founded in 1874, is a digest of Indian news for dispatch by the European mail.

Piotrkow. Dist. of Poland. Bounded S. by Galicia, N. by Warsaw, W. by Kalisz, and E. by Radom and Kielce, its area is 4,730 sq. m., more than half forest. It is the great industrial district of Poland, having important beds of coal and iron. Lodz, the great textile centre, is the largest town. Pop. 2,000,000. *Pron.* Pyotr-kof.

Piotrkow. Town of Poland, capital of the dist. of the same name. It stands on the river Strada and the Warsaw-Vienna rly., 25 m. S.E. of Lodz, and 80 m. S.W. of Warsaw. There are tanneries, foundries, and textile factories. In the 15th century the kings of Poland were elected here. Pop. 45,000.

Piou-piou. Familiar name for the French soldier of the line. It is more or less equivalent to the British Tommy.

Piozzi, HESTER LYNCH (1741-1821). British authoress, friend of Dr. Johnson. She was born at



H. L. Piozzi

Bodvel, Carnarvonshire, Jan. 16, 1741, and her father, John Salusbury, taking up an appointment at Nova Scotia, she was brought up by his brother, Sir Thomas Salusbury, at Offley Hall, Hertfordshire, where she became acquainted with Henry Thrale, son of a rich brewer, to whom she was married in 1763. They made their

home at Streatham Park, near London, where the long friendship with Dr. Johnson began. Mrs. Thrale's energy and business capacity were of immense assistance to her husband when he became financially embarrassed in 1772. Their liabilities amounted to £130,000, but were fully discharged by 1781, when Thrale died of apoplexy, his widow afterwards selling the brewery to the Barclays.

A friendship, formed in 1780, with Gabriel Piozzi, an Italian musician, ripened into passionate attachment, and after much altercation with her children, Mrs. Thrale was married to him in July, 1784. The Piozzis lived first at Streatham Park, and after 1795 in Wales, where Piozzi died in 1809. She herself died, May 2, 1821. Mrs. Piozzi was a woman of great ability and charm, and widely, though not deeply, read. Her purely original work is of no account, but her *Anecdotes of Dr. Johnson*, and a collection of letters that passed between them, throw interesting sidelights on the age. See Johnson; Thrale, H.

Bibliography. *Autobiography, Letters, and Literary Remains*, 1861; *Piozziana, or Recollections of P.*, by a Friend, E. Mangin, 1833; *Mrs. Thrale, Sketches of Her Life*, L. B. Sealey, 1891; *Dr. Johnson and Mrs. Thrale*, including Mrs. T.'s *Journal of the Welsh Tour*, 1774, A. M. Broadley, 1910.

Pipe. Tubular channel for the conveyance of gases, liquids, and, under some conditions, solids. Metal pipes are widely used in structural work instead of solid bars, and their lightness and strength render them valuable for many purposes.

Earthenware, concrete, cast-iron, and cast-steel pipes are made in moulds; and the first are hardened by being fired in kilns. Glass tubes are drawn out of cylinders. Lead and composition tubes are extruded through a die by pressure. Seamless pipes of wrought iron, copper, brass, and various alloys are drawn through dies of gradually decreasing external diameter.

In the Mannesmann process of steel pipe-drawing, a solid bar is heated and passed between conical rollers crossing one another at a small angle. Pipes of these metals, especially those of large diameter are formed also by bending strips into tubular form, and welding the edges. Welded pipes are not so strong as seamless, and riveted pipes have considerably less

strength than welded. Rubber tubes are either extruded through a die, or formed like a welded metal tube round a mandrel. Flexible metal tubing for carrying water or steam under high pressure is made by winding a strip of metal helically on a bar, while turning the edges over so that every coil interlocks with the next.

Pipes are jointed together end to end in many ways. The socket-and-spigot joint, made secure by caulking with cement or lead, is perhaps the most common for drain pipes and water mains. Pipes subjected to very high pressures usually have flanged ends, drawn together against a packing by bolts. See *Aqueduct*.

Pipe. In music, a general name for wind instruments, more particularly those of the whistle or flute family, and thence by analogy the sound of the song of birds. It is also the medium by which sound is produced in the organ. Here the pipes vary in (a) length, governing the pitch; (b) scale, or proportion of diameter to length; and (c) material and shape, affecting the quality, though here the

question of "voicing" comes in. They may be open, or stopped, and made of wood or metal (tin, "spotted metal," zinc, etc.). A set of pipes having the same quality and ranging through the whole compass is known as "a stop." Stops are composed either of flue pipes or of reeds. In the former case the wind conveyed from the bellows impinges upon the lip of the pipe, thereby setting in vibration the column of air therein; in the latter case the sound is produced by a tongue of metal, the pipe being of comparatively minor importance. See *Greek Art*.

Pipe, TOBACCO. Utensil for inhaling tobacco smoke, usually a tube of clay or wood, with a bowl to hold the tobacco. Pipes were introduced into England in 1586 by Ralph Lane, governor of Virginia.

Pipe-making became an organized craft in London in 1619. Clay was the first material used, and still furnishes the commonest and cheapest pipes. Roughly shaped, it is drawn



Pipes for tobacco smoking. 1. Examples from the Upper Nile. 2. Ainu pipe and holder, Yedo. 3. Bamboo pipe, Torres Strait. 4. Bowls and broken stems of Elizabethan and Carolean clay pipes. 5. Wooden pipe said to have been given to Sir W. Raleigh by Indians; top of bowl indicated by x; mouthpiece extends to left. 6. Stone and clay pipes made by American Indians.

1, 2, & 3 by courtesy of British Museum; 6, by courtesy of American Museum Journal

over a steel rod and put in the bottom half of a mould, which, with the top piece, is placed in a press; a lever, with a cone-shaped projection to form the bowl, is pulled down; the top of the bowl is cut clean by a knife drawn through an opening. Placed on a support at each end, the pipe is curved by its own weight; it is then baked, polished, and the end tipped with molten sealing wax to form a mouthpiece. This is the long variety known as the churchwarden, but the short clay pipes known as cutties or, in Ireland, dhudeens, are made on the same method.

Wooden pipes are now in almost universal use, the wood chiefly employed being that of the tree heath, *Erica arborea*, the French *bruyère*, whence the popular name briar root pipe. The tree is grown chiefly in S. France, Italy, and Asia Minor, and the pipes are largely manufactured in Nuremberg and E. France. The desired colour is obtained by boiling the blocks, skilfully cut from the roots so as to avoid waste, in a vat for twelve hours.

The oldest pipes known are those found in the so-called pipe mounds of the Mississippi valley. Apart from their archaeological and ethnographic value, they are interesting owing to their want of stems. They were formed of one piece of stone, 3 to 4 ins. long and about 1 in. broad, with the bowl in the centre and the tube leading to it pierced from one end. The bowl was often elaborately carved. Notable American pipes are the calumet (*q.v.*), tomahawk pipe, and the whalebone pipes of the Stikine Indians.

In the 18th century fine porcelain pipes were made at Chelsea, Sèvres, Dresden, Vienna, and elsewhere, and heavy, pendent porcelain pipes, often with metal covers, are still popular among Teutonic smokers. Other materials used in pipe manufacture are meerschaum (*q.v.*), ivory, glass, horn, metals, cane, and bamboo. Characteristic pipes are the Turkish chibouque, Indian nargileh, and Persian hookah (*q.v.*). Of pipes smoked by half-civilized peoples, mention may be made of the three-bowled pipe of the Kirghiz, bamboo cylinder of New Guinea, the small metal-bowled pipe of the Eskimo, the antelope's horn with upright wooden stem of E. Africa, and the walrus tooth pipe of the Laplander.

Pipe. Measure of liquid capacity. It varies according to the locality, and the liquid that is measured. The ordinary pipe is two hogsheads, equivalent to 108 imperial gallons, or 126 wine

gallons. Two pipes form a tun. A pipe of Madeira contains 92 gallons; of sherry 108; and port wine 115. See Weights and Measures.

Pipe and Tabor. Two instruments formerly much used to accompany morris-dancing, and



Pipe and Tabor, as represented in an illustration to Kemp's Nine Days Wonder. 1609

tabor, a small shallow drum a foot or so across, which was beaten with a stick in his right hand. See Morris Dance.

Pipe Clay. Variety of natural clay. It is used for whitening military accoutrements, etc., and for making certain kinds of pottery, especially pipes.

Pipe-fish. Popular name for a group of long, slender fishes constituting several genera of the

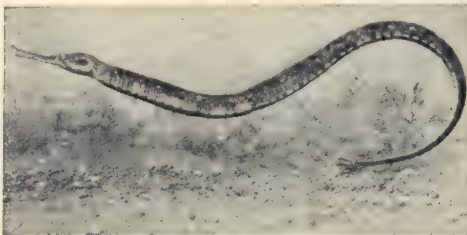
known popularly as whittle and dub. The pipe was a kind of small recorder (*q.v.*), but with only three holes, two at the front for the first and second fingers, and one at the back for the thumb. The player held it in his left hand, from the wrist of which hung the

straight-nosed pipe-fish (*Nerophis aquoreus*) may be 2 ft. in length; the greater pipe-fish (*Syngnathus acus*) and the broad-nosed pipe-fish (*Siphonostoma typhle*) each 15 ins.; whilst the smooth and cylindrical worm pipe-fish (*Nerophis lumbriciformis*) is only five or six ins. In the last-named the eggs are embedded in the skin of the male.

Pipe Line. Stretch or line of piping for the conveyance of fluids. Although steam, gas, air, and water mains may be said to constitute pipe lines, the term is more particularly applied to long stretches of piping, in which oil or water is conveyed from a source of supply to a storage reservoir. The pipes may be laid above or below ground, according to local circumstances, e.g. where they are subject to the effects of frost, they are either laid below ground, or covered with non-conducting material.

An oil pipe line is for the conveyance of oil, e.g. of petroleum pumped from oil wells to a reservoir, or from a tank steamer to an inland storage tank. In cold weather crude oil is often heated to lower its viscosity and facilitate its flow through the steel piping generally employed.

A water pipe line is a modern substitute for an aqueduct proper for the conveyance of water from a source of supply to a distribution centre. In some cases sections of pipe line are laid between sections of aqueduct, and may act as syphons. The following is a description of a pipe line 230 m. long in which water is conveyed from springs at Sololi in the Andes to the waterless district of Antofagasta,



Pipe-fish. The long slender fish that lives among seaweed in shallow waters

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family Syngnathidae. The skeleton is incompletely ossified, and the angular, ridged exterior is covered with large, bony plates. There are no ventral or anal fins, and the long dorsal fin is without rays. The jaws are united to form a long tube with the small mouth at its extremity. The gills take the form of paired tufts upon the bronchial arches, and the gill-cover is a large, fixed, bony plate with only a small aperture to admit water to the gills. In most cases the males are provided with marsupial pouches in which they carry the eggs until they are hatched. They make their home among seaweeds in shallow water.

Five species are found on the British coasts. Of these the

on the Chilean coast. At a height of 14,000 ft. a natural supply of water is impounded by dams, and from the reservoirs so formed is conveyed in pipes for the whole distance, an average of 3,000 tons and a maximum of 8,000 tons of water a day being delivered at Antofagasta from a single pipe. As such a great head of water would result in a pressure of several tons per sq. in. in the pipes, the line is divided into sections by means of break-pressure of relief tanks or reservoirs into which the water is freely discharged from the pipe at the lower end of each section. These tanks provide new heads of water and correspondingly reduced pressures in the sections below them. The average hydraulic gradient of this pipe line is 1.85 p.c.,

which is equal to a fall of about 22 ins. in every 100 ft.

The pipes vary from 8 ins. to 11 ins. in diameter, according to the pressure, the smaller diameters being used on sections where the greatest pressures occur. Cast-iron pipes are used for low-pressure sections, but steel pipes are chiefly provided where the pressure exceeds about 180 lb. per sq. in. The maximum pressure in any section is 900 lb. per sq. in. The piping more or less follows the natural contour of the ground; where this rises and falls, at each summit an air valve is provided, encased in a vertical dome with a small outlet inserted in the pipe line. The valve, actuated by a float within the dome, opens when an accumulation of air occurs; but the moment the air escapes, the water, rising to fill the air space, lifts the float and closes the valve. To provide against loss of water in the event of bursts, stop valves are provided at suitable intervals. Many other types of valve for various purposes, as well as meters, are included in the system. See Oil.

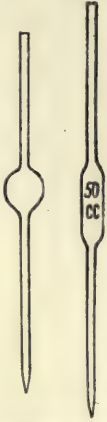
Piperaceae. Herbs and shrubs, widely distributed over the warmer regions of the earth. They have jointed stems, and the leaves are mostly alternate or in whorls. The flowers are small, disposed in spikes or sprays. Many of them are aromatic; some produce acrid resin or aromatic volatile oil. There are about 1,150 species, distributed over eight genera. See Betel; Pepper.

Piperine. Alkaloid contained in black pepper. It is of a lemon-yellow colour, and when dissolved in alcohol develops the characteristic pungent taste of pepper.

Pipe Roll. Term applied to the Great Roll of the Exchequer preserved in the Record Office, London. It contains the accounts of the revenue collected by the sheriffs, which were called pipes, either because they were sent to the crown office in cylinders, or because of their tubular form when rolled. The records go back to the reign of Henry II, and are a mine of information on all matters relating to the revenue of the crown, etc. See Record Office.

Pipette. Narrow graduated glass tube adapted to deliver small volumes of liquid and employed in chemical analysis. The liquid is introduced into the pipette by applying suction from the mouth at the upper end, while the lower end is dipped into the liquid. The upper end is then rapidly closed by applying the finger. One kind of pipette is adapted for delivering

one volume of a liquid, while another variety has graduations throughout its length, and small amounts of liquid can be released by relaxing the pressure of the finger on the upper end.



Pipette. Types used in chemical analysis

Pipil. American Indian tribe in S.E. Guatemala and Salvador at the time of the Spanish conquest. An early offshoot of the ancient Mexican people, speaking primitive Nahuatl, they maintained their independence amid the Maya civilization. Statues and bas-reliefs of Toltec type from Santa Lucia Cozumalhuapa are attributed to them. See Nahuatl.

Piping Crow (*Gymnorhina*). Genus of birds forming a subfamily of the crows. There are three species, all restricted to Australasia. They have black and white plumage, and are often called Australian magpies. In captivity they display great skill in learning to whistle tunes and to talk, for which reason they are popular as pets. Their food consists mainly of grasshoppers and other insects.



Piping Crow, the white-backed species

Pipi Pods. Astringent seed-pods of *Caesalpinia pipai*, used as a dye-stuff, but inferior to those of *C. coriaria*. See Divi-divi.

Pipit (*Anthus*). Genus of small passerine birds, related to the wagtails. Great Britain possesses four species. The meadow pipit (*Anthus pratensis*), the commonest, is to be seen almost everywhere in the country, running on the ground in



Pipit. *Anthus petrosus*, the rock pipit of Britain

search of insects and seeds. The tree pipit (*A. trivialis*) is migratory, arriving in April and leaving in Sept. In appearance it is difficult to distinguish from the meadow pipit. The rock pipit (*A. petrosus*) is the only British song-bird that lives among the rocks on the coast, where it feeds on small crustaceans and worms. The water pipit (*A. spinoletta*), Richard's pipit, and the tawny pipit are only occasional visitors to the S. of England. The pipits are often mistaken for larks, to which they are very similar, and are locally known as larks, e.g. the tree pipit is called the woodlark in Scotland and the meadow pipit generally is the titlark. See Egg, colour plate.

Pippin. Name for many varieties of apple, notably Cox's Orange Pippin, Newtown Pippin, Ribston Pippin. The word was once applied to any apple raised from pips and not by grafting. See Apple.

Pip Ridge. Ridge of Macedonia, Greece, a few miles W. of Lake Doiran (q.v.). Fortified by the Bulgarians in the Great War, it was an objective of the Allies in their final offensive in 1918. Its E. slope was the scene of an attack by British infantry on Sept. 18 to distract attention from the flanking movements of the Serbs and French. See Doiran-Struma Front, Fighting on the; Salonica, Expedition to.

Piqua. City of Ohio, U.S.A., in Miami co. It stands on the Miami river, 73 m. W. by N. of Columbus, and is served by the Cincinnati, Hamilton and Dayton and other rlys., and by the Miami and Erie Canal. Steel and iron goods, woollens, furniture, etc., are manufactured. Founded in 1809, as Washington, and given its present name in 1823, Piqua became a city in 1846. Pop. 15,000.

Piqué (Fr., quilted). Name given to fabrics in which ribs raised in high relief are woven laterally. Washing dresses for summer wear are customarily made of cotton piqués.

Piquet. Card game known in England in the 16th century as la ronne and subsequently in the time of Charles I as piquet. It is played by two persons with 32 cards, the six down to the deuce inclusive of each suit being discarded from the ordinary pack. The cards rank from ace, king, queen, knave, ten, etc.; the ace counts the highest both in cutting and play, and there are no trumps.

The cards are cut for seat and deal, the lowest having the choice. Each player receives twelve cards,

dealt in twos or threes, generally two at a time. The remaining cards are laid upon the table face downwards; the three bottom cards being placed in a row, and the other five in another row over them, these forming the stock or *talon*. The object of the game is to score points for certain combinations and for tricks. The game begins by the players examining their hands; if the leader or elder hand (non-dealer) has no king, queen, or knave—termed *carte blanche*—he announces it, and scores 10 points. If the second player has a *carte blanche* hand, he does not declare it until the leader has discarded. The non-dealer has considerable advantage from being elder hand; he can take any five cards from his hand which seem the least likely to increase his score, and, laying them aside, take as many from the *talon*. The younger hand then lays out three and takes the last three of the *talon*.

The following combinations to be tried for are: *Carte blanche*. Having no picture card in the hand; this takes precedence of everything else (= 10 points). *Four* or *Quatorze*. Either four aces, kings, queens, knaves, or tens (each quatorze = 14 points). *Threes*. In either aces, kings, queens, knaves, or tens (= 3 points). *Point*. The greatest number of pips on cards of the same suit (= as many points as cards). *Tierce*, or three of a sequence (= 3 points). *Quart*, or four of a sequence (= 4 points). *Quint*, or five of a sequence (= 5 points). *Sixième*, or six of a sequence (= 6 points). *Septième*, or seven of a sequence (= 7 points). *Huit*, or eight of a sequence (= 8 points).

The elder hand calls what he holds, and his opponent, if he cannot beat it, replies, "Good," and the elder hand proceeds to count it; otherwise his opponent says "Equal" or "Not good." The first procedure is to call and score the *point*, the player holding the highest in this regard only scoring it. The other combinations are then counted aloud by each, after which they proceed to play for the tricks. There being no trumps the highest card of each suit wins the trick. A player is bound to follow suit if he can, but is not obliged to take the trick. The leader counts one for each card led, whether it wins a trick or not.

If the trick falls to the second player he also counts one; then leads the next card, counting one for the card led, and so on. The winner of the last trick counts one extra for the last card. Tricks are placed face upwards, as played.

Pique is when the elder hand counts 30 in hand or play before his opponent has scored, in which case he adds 30 more to his score. *Repique* is when either player can score 30 from the combinations in his hand before a card is played, in which event he scores an additional 60. A game consists of either 100 points, or for the greatest number of points obtained in six hands. See *The Complete Hoyle*, R. F. Foster, new and enlarged ed. 1909; *The Official Rules of Card Games*, R. F. Foster, 1914. *Pron.* pikett or picket.

Piracy (Gr. *peirâtēs*, an adventurer who makes attacks on ships). The offence, by common law, of committing those acts of robbery and depredation upon the high seas which, if committed upon land, would have amounted to felony there. By statute it includes some other offences. Thus any natural-born British subject who commits any act of hostility upon the high seas against other British subjects under colour of a commission from a foreign power, or who, in time of war, does so or assists an enemy at sea, is liable to be convicted as a pirate; so too is any commander or seaman who betrays his trust and runs away with any ship, ammunition, ordnance, or goods, or yields them up voluntarily to a pirate. The punishment for piracy was formerly death, both for principals and for accessories before or after the fact, but is now penal servitude for life, or imprisonment not exceeding three years. See *Buccaneers*.

Piræus. One of the chief seaports of ancient Greece. Situated on the Saronic Gulf, 6 m. S.W. of Athens, it owed its foundation to Themistocles and Pericles. It was destroyed by Sulla, 86 B.C., and was not rebuilt until the 19th century, after the establishment of the modern kingdom of Greece. Formerly connected with Athens by the well-known "Long Walls," it now has railway communication. *Pron.* Py-ree-us. See Athens.

Piranesi, GIAMBATTISTA (1720-78). Italian engraver and architect.

Born at Venice, the son of a mason, he studied under Valeriani and G. Vasi, the engraver. He started practising as an architect in Venice, but was attracted to Rome, where he at once began the engravings of ancient monuments published in 1750 under the title of *Della Magnifi-*

cenza ed Architettura dei Romani. He etched nearly 2,000 plates before he died in Rome. A picturesque draughtsman, addicted to moonlight effects with strong light and shade, he drew also with the enthusiasm and knowledge of an antiquary, and his work is of inestimable value to the student of architecture. See *Piranesi: His Life and Works*, A. Samuel, 1910.

Pirano. Town and port of Italy, in the peninsula of Istria. It is 13 m. S.W. of Trieste. Salt is the chief export from the convenient harbour. Part of the ancient fortifications still stand; the cathedral rises from massive foundations on the N. shore. Tartini, the composer, was born here in 1692. Pop. 15,000.

Pirate, THE. Sir Walter Scott's fourteenth novel, published in Dec., 1821. It is a romance of Zetland (Shetland) and the Orkneys at the close of the 17th century, and is remarkable for its scenic descriptions and its reflection of the author's philosophy of life. Cleveland, the pirate, was drawn from John Gow, who was captured in 1725. A notable character is Norna of the Fitful Head.

Pirate Bridge. Card game, a variety of auction bridge and solo whist. In pirate, partners are not cut for as in auction, as there are no permanent partnerships. The bidder is accepted by any one of the three who thinks his hand will fit. The values are as at auction, as are the honour scores, slam, bonuses, etc. The dealer is not obliged to bid, but may pass if he pleases. Where a bid has been made, each player, in turn to the left, must either pass or accept. No bid can be raised, overcalled, or doubled until it has been accepted by some player. If no one makes a bid which is accepted, the deal is void and passes to the next player on the left. The acceptor of a bid becomes the partner of the bidder for the time being, but he is not bound to continue the partnership if further bidding occurs. A bid which is not accepted is void. But the player on the left of the unaccepted bidder can make a bid, just as if the unaccepted bid had never been made.

When the bid has been accepted, each player to the left of the acceptor may bid higher or pass. Either of the opponents can double in his turn, and the bidder or his acceptor can re-double in his turn. If no one overcalls an acceptance, the acceptor himself cannot bid higher. An unaccepted bid made over a call that has been then accepted is void. The caller of the bid that is allowed to stand is known as the declarer. His



G. Piranesi,
Italian engraver

acceptor is dummy, but he does not change his seat and sit opposite to him. The declarer alone can score towards game. The acceptor of the declarer scores only above the line. The declarer scores 50 points if he wins a game, and 50 points for the rubber. These points are not shared by the acceptor. See Auction Bridge; Bridge; consult also Pirate Bridge, R. F. Foster, 1919.

Pirates of Penzance, THE. Comic opera written by W. S. Gilbert, composed by Arthur Sullivan. It was produced April 3, 1880, at the Opéra Comique Theatre, London, and had a run of 363 continuous performances. George Grossmith, Richard Temple, Rutland Barrington, Julia Gwynne, Emily Cross, and Marion Hood were in the original cast.

Pirênê. Fountain at Corinth. It issued from the rock on the Acrocorinthus. It was said to have first gushed forth at the stamp of the foot of the winged horse Pegasus, which Bellerophon (*q.v.*) caught here.

Pirmasens. Town of Bavaria. It is 40 m. S.W. of Spire, in the Bavarian Palatinate. The chief industry is the manufacture of boots and shoes and the preparation of leather. In the 18th century it was part of Hesse-Darmstadt, and in 1815 passed to Bavaria. It is named after S. Pirmin, who preached here in the 8th century. Pop. 38,000.

Pirna. Town of Saxony. It stands on the Elbe, about 10 m. S.E. of Dresden, and was in medieval times a fortified town. The chief industries are the making of glass, pottery, etc. There is a trade in grain along the Elbe, and stone is quarried in the neighbourhood. Above the town is the Sonnenstein, once a strong fortress commanding the Elbe, and earlier a castle that protected the town. The fortifications, both of the city and on the

hill, were destroyed in the 18th century. In early days part of Meissen, Pirna was included in Saxony about 1423. Pop. 21,000.

Piron, ALEXIS (1689-1773). French dramatist. Born at Dijon, July 9, 1689, he settled in Paris in 1719, and first won success with a dramatic monologue, *Arlequin Deucalion*. Of his numerous plays only one survives, *La Métromanie*, 1738, which ranks among the best comedies of the 18th century. Among his contemporaries he was famous for his wit and caustic epigrams. He died Jan. 21, 1773.

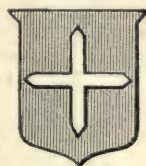
Pirot. Town of Serbia, the chief town of the department of the same name. It is situated on the Nishava, 35 m. S.E. of Nish, and is on the trunk rly. from Nish to Sofia-Constantinople. It has cloth and carpet industries. In 1885 it was the scene of a defeat of the Serbs by the Bulgars. During the Great War it was captured from the Serbs by the Bulgars, Oct. 26, 1915, and recaptured, on Oct. 14, 1918, by a Serbo-French force, from the Austro-Germans. Pop. 10,700. The province has an area of 934 sq. m., and a pop. of about 115,000.

Pirrie, WILLIAM JAMES PIRRIE, 1ST VISCOUNT (1847-1924). British shipbuilder and shipowner. Born at Quebec, May 31, 1847, he was of Irish parentage, and was educated in Belfast. As a youth he entered the shipbuilding yard of Messrs. Harland & Wolff. In 1874 he became a partner in the company, and later chairman, and it was due mainly to his energy that the firm obtained its commanding position. Pirrie was made a privy councillor in 1897, a baron in 1906, and viscount in 1921. He never sat in the

House of Commons, but was an influential man in the N. of Ireland. At first a Unionist, he became a Liberal and a Home Ruler about 1904. In 1918 he was made controller-general of merchant shipbuilding. In 1921 his firm took over the various ship-repairing works from the Port of London Authority. He died June 5, 1924.

Pisa. Maritime prov. of N.W. Italy, in Tuscany, facing the Ligurian Sea. Curving round the prov. of Leghorn (*q.v.*), and traversed in the N. by the Arno, it yields marble, copper, and coal. It also produces cereals, wine, and oil, and manufactures silk, cotton, linen, pottery, glass, and soap. Its area is 1,185 sq. m. Pop. 351,800.

Pisa (Lat. *Pisae*). City of Italy, capital of the prov. of Pisa. It stands on the Arno, 7 m. from the



Pisa arms

Ligurian Sea and 50 m. by rly. W. of Florence. Famous in art and history, its present business is mainly with tourists and the university. The busiest part of the town is built around the banks of the Arno, but the most interesting quarter is the Piazza del Duomo. The cathedral, built 1063-1118, and restored in the early 17th century, is of white marble with an elliptical dome and an arcaded façade. The circular marble baptistery (1153-1278) has an octagonal font and a fine hexagonal pulpit by Niccolò Pisani. The campanile, usually known as the Leaning Tower, was built 1174-1350 and rises to a height of 179 ft. in eight colonnaded storeys. It is 16½ ft. out of the perpendicular, the ground on the S. side having presumably sunk. The beautiful cloistered cemetery (1275-84), with earth reputed to have been brought from Calvary, is built in Tuscan-Gothic style and has medieval frescoes and Etruscan and other sculptures.

Among other interesting churches are S. Maria della Spina (1325-29); the basilica of S. Michele; S. Paolo and S. Niccolò, both of the 13th century. The university, a 12th century foundation, is housed in a handsome Renaissance building and has a library with over 200,000 volumes and many invaluable MSS. The municipal museum has a representative collection of Tuscan paintings and sculptures; there are also a natural history museum, botanical gardens, and an art academy. The leading industry is the manufacture of cottons. In the vicinity are thermal



1st Viscount Pirrie, British shipbuilder



Pirna, Saxony. Market place, with Town Hall on the left, looking towards the 16th century Town Church

mineral springs and a royal stud farm for horses and dromedaries. It was at the village of Gombo, $1\frac{1}{2}$ m. W., that Shelley was drowned July 8, 1822.

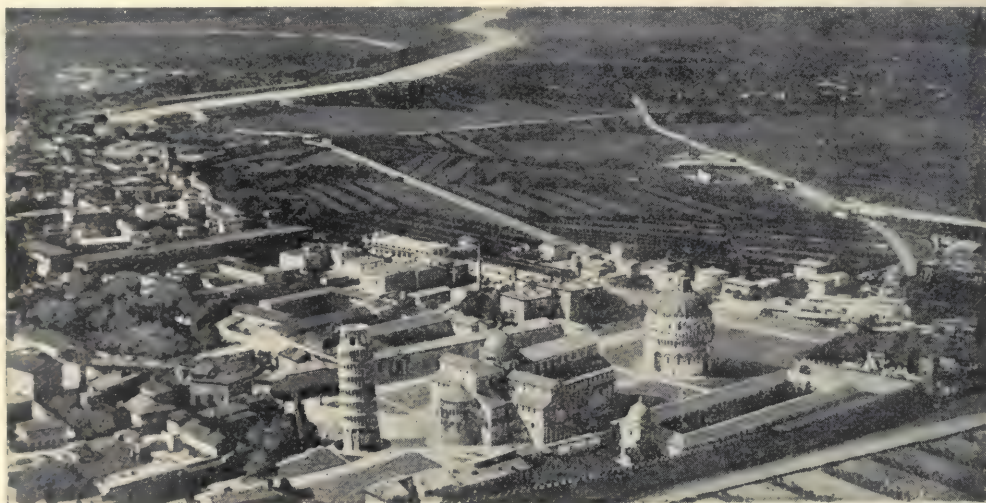
Originally a Greek colony, it became later an important Etruscan city and then a flourishing Roman port, whence marble and wood were shipped. After its decline under the domination of the Franks, Pisa rose to importance again by the 11th century, and, after a series of successful conflicts with the Saracen pirates, became a flourishing naval republic, with dominion over Corsica, Sardinia, and the Balearic Isles. In 1099 it sent vessels to the 1st crusade. After continuous struggles with Florence, Pisa was vanquished in 1405, and remained an integral part

of Tuscany until the unification of Italy in 1860. Pop. 67,280. See Baptistery; Campo Santo; Pulpit; consult also *The Story of Pisa*, J. A. Ross and N. Erichsen, 1909.

Pisa, COUNCIL OF. Church council held in 1409 to settle the great schism occasioned by the residence of the popes at Avignon. Summoned by the college of cardinals, the rival popes Gregory XII and Benedict XIII refused to appear, and the council of 24 cardinals, 80 bishops, and many other ecclesiastics of authority declared them both schismatics and elected Peter Philarges (Alexander V) to the papal throne, June 26, 1409. The schismatics, however, refused to recognize the authority of the council, and the schism lasted another thirty years.

Pisagua. Seaport of Chile, in the prov. of Tarapacá. It is 48 m. N. of Iquique, with which it is connected by rly. Its chief export is nitrate of soda. In 1868 and 1877 it was almost destroyed by earthquakes. Near the town the Chileans defeated an army of Peruvians and Bolivians, Nov. 19, 1879. Pop. 4,000.

Pisano, ANDREA (c. 1270-1349). Italian architect and sculptor. Born at Pontedera, he constructed a good part of the fortifications of Florence, and the stronghold of Scarperia in the Val di Mugello. His greatest achievement, however, was the decoration in relief of one set of bronze doors of the Baptistery at Florence, the other set being executed by Ghiberti. He worked also at Venice, and died at Orvieto.



Pisa, Italy. The cathedral from the south-west, showing west façade and Leaning Tower, or Campanile. Top, air view from the north; left to right are seen the Leaning Tower, Cathedral, and Baptistery, and, in right foreground, the Campo Santo

Top view by courtesy of the Italian Air Service

Pisano, Niccolò (c. 1206-78). Italian sculptor. Born either at Pisa or in Apulia, his best known works are the sculptured pulpit of the Baptistery of Pisa, 1260, and that of Siena Cathedral, 1268. These are inspired by the classic remains of Tuscany. He worked also at Bologna and Perugia. Architect and engineer as well, he influenced a large number of pupils in the direction of a less hieratic art than had previously obtained in Italy. See Pulpit.

Pisano, Vittore, or Pisanello (c. 1380-1456). Italian painter and medallist. Born at San Vigilio, he painted frescoes at Verona, Ferrara, Venice, Mantua, excelling in the renderings of animals, particularly horses; an example is the fresco of S. George, painted for S. Anastasia, Verona. Animal life is also well interpreted in his panel, Miraculous Stag appearing to S. Eustace, in the National Gallery, London. A great number of portrait medals of contemporary notabilities were executed by him. He died in Rome.

Piscary, Common Of, or Common of Fishery. English law term, describing the right of fishing in another man's water. The right is annexed to land. In some ancient manors the whole of the freehold tenants of the manor, and in others the tenants of certain farms, have a right to fish in the rivers or ponds of the lord of the manor. This is the original common of piscary. Sometimes the right extends only to certain seasons of the year; and sometimes only certain kinds of fish may be taken. A several fishery is an exclusive right to fish in certain waters. See Angling.

Pisces (Lat., fishes). Zoological name for the class of vertebrates popularly known as fishes. See Animal; Fish.

Pisces. In astronomy, the twelfth constellation of the Zodiac. It contains no bright stars. Alpha Piscium is a variable double star of the fourth magnitude, while zeta and eta Piscium are triple. Owing to precession of the equinoxes the first sign of the Zodiac, Aries, is now in this constellation. See Constellation; Zodiac.

Pisciculture (Lat. *piscis*, fish). Term used for the culture of fish. See Fish Culture; Fish Hatchery.

Piscina (Lat., a fishpond, cistern). In eccles. architecture, a bowl for water recessed in a niche, in which the priest could wash his hands or the sacred vessels after the service. Its place was generally in the sanctuary wall, south of the altar; where there was more than one altar, a piscina might be found in the neighbourhood of each. The



Piscina in the chapel of S. Mary Magdalene, Exeter Cathedral

constellation is Fomalhaut or the Fish's Mouth, one of the four ancient royal stars.

Pisé de Terre (Fr., rammed earth). Method of building adopted in pre-Columbian America, familiar in France, and adopted by settlers in Australasia, where the material dries almost as hard as cement. Walls are formed by ramming earth or chalk into temporary moulds or shapes of wood, which are removed when the earthen walls can dispense with support. Corrugated iron roofing completes an inexpensive but primitive dwelling. In 1916 the method was recommended for adoption in Britain, in view of the shortage of housing accommodation, and in 1917 some pisé de terre hutments were constructed in Surrey.

Pisek. Town of the republic of Czecho-Slovakia, in Bohemia. It is 24 m. W.S.W. of Tabor, and is a rly. junction on the Watawa. A mediaeval castle and fortifications are still preserved. Here is a state school of forestry and agriculture. Woollens and cottons, iron wire, and musical instruments are manufactured. Pop. 16,500.

Pisgah. Mt summit in Moab. From it Moses was permitted sight of the land of Gilead (Deut 34)



Pistachio Nut. Leaves and nuts of the plant. Inset, single nut

piscina and its architectural setting were often very elaborately decorated. In Roman architecture the term signified either a fishpond or a tank for bathing.

Piscis Australis OR THE SOUTHERN FISH. One of the southern constellations. The chief star of the

The word is usually accepted as an alternative for Mt. Nebo, or as indicating a summit of that mt.

Pishin. District of British Baluchistan. Occupied by the British since 1878, it lies N. of Quetta. The railway from Quetta passes through it as far as the Afghan frontier on the route to Kandahar. Before 1878 it belonged to Afghanistan. Area, 2,700 sq. m. Pop. 55,000.

Pisidia. Inland dist. of Asia Minor, lying N. of Lycia and Pamphylia. In ancient times the inhabitants, a hardy and warlike folk, succeeded in maintaining some degree of independence even against the Romans.

Piso, Lucius Calpurnius. Roman statesman. As consul at Rome, 58 B.C., he took a leading part in the proceedings which led to the banishment of Cicero. He was governor of Macedonia, 57-56, and was attacked for extortion by Cicero in two speeches. He was father-in-law of Julius Caesar.

Gnaeus Calpurnius Piso; governor of Syria under Tiberius in A.D. 18, was accused of the murder of Germanicus, and committed suicide before the trial. Gaius Calpurnius Piso conspired against Nero in A.D. 65, and committed suicide on the discovery of the conspiracy. See Germanicus.

Pissarro, Camille (1830-1903). French painter. Born at St. Thomas, in the Danish Antilles, he studied in Paris



Camille Pissarro, French painter
P. Holtzer

under Antoine Melbye and Corot. His earlier sympathies were classic, but he came under Manet's influence and was one of the first Impressionists of 1874. Later, he launched and led the Pointillist painters; but did not adhere too strictly to the theory of the division of tones held by this group. He virtually confined himself to landscapes, producing beautiful views of Paris, where he died Oct. 12, 1903.

His son, Lucien Pissarro (b. 1863), became an exponent of the Pointillist method of impressionism, exhibiting many landscapes both in Paris and in London. As an engraver on wood he reproduced several of his father's drawings.

Pistachio Nut (*Pistacia vera*). Small tree of the natural order Anacardiaceae, native of W. Asia. The leaves are divided into three or five oval leaflets, and the small brownish-green flowers are without

petals, the sexes on separate trees. The oval reddish fruits are about an inch long, and contain a single green, oily seed enclosed in a bony shell. They are eaten dry like almonds, or made into various forms of confectionery. The tree also produces galls used in dyeing and tanning.

Pistil (Lat. *pistillum*, a pestle). Botanical term for the female organs in a flower, including the ovary, the style, and the stigma. The ovary, containing the ovules or seed-eggs, develops after fertilisation into the seed-vessel. The style is often absent, when the stigma is seated directly upon the ovary. The stigma may be thread-like (filiform), knobbed (capitate), lobed, etc.; and is either sticky, rough with raised points, or hairy, to retain the grains of pollen. The latter send out long shoots which penetrate the length of the style and enter the ovary, where they fertilise the ovules. See Flower.

Pistoja (anc. *Pistoria*). Walled city of Italy, in the prov. of Florence. It stands on the left bank of the Ombrone, 21 m. by rly. N.W. of Florence. The walls date from 1302 and the cathedral from the 12th and 13th centuries. The Palazzo Pretorio, 1367, and the Palazzo del Comune, with the Ospedale del Ceppo, 1277, are fine examples of medieval architecture. Pistoja, in art history, held rank midway between Florence and Pisa; and its early sculpture is especially remarkable.

The city's industries are connected with iron, steel, glass, paper, silk, macaroni, and oil. Pistoja is well known also for its small arms manufactures. Catiline was defeated here in 62 B.C. The scene of fierce faction fights in the Middle Ages between the Guelphs and Ghibellines, it fell to Florence in 1351. Pop. 65,000. Pron Pistô-ya

Pistol (Fr. *pistolet*, originally a dagger, made at Pistoja). Pistols may be defined as firearms capable of being used from one hand, and accepting this definition it would appear that they were invented about 1500. In 1515 the wheel-lock was invented, making a great advance in the mechanism of firearms generally, and gave a decided impetus to pistol manufacture, since it was then possible to construct a weapon which could easily be carried or concealed on the person. These pistols were frequently constructed with bell mouths for use at close quarters with a scattering charge. The flint-lock became well known about 1630, but it was some time before it entirely superseded the wheel-lock, retaining its position until about 1825.

Before the end of the 17th century pistols about 18 ins. long were being made, and shortly afterwards, owing to better methods of manufacture and increased accuracy, the size was further reduced. Pistols, with a half-inch bore, became duelling weapons in 1780. Rifled pistols were often constructed so that the barrel would screw out of the breech block to facilitate loading, and two and four barrelled pistols were in-

ignition. By this time the weapons were practically all rifled. By 1835 the revolver was highly developed, and practically no further advance has been made. At the present time a few breech-loading single-barrel pistols are made, but these chiefly fire the .22 rim-fire cartridge, and are only used for target practice. At one time the .410 single Derringer pistol was much used as a pocket pistol in Western America, but is now almost obsolete.

Automatic Weapons

The next development of this weapon is of much more recent date, and concerns the automatic pistol, which in some fields seems likely to displace the revolver. This is an adoption of the machine-gun principle in which the recoil of the weapon actuates mechanism which ejects the empty shell, cocks the pistol, and reloads the chamber from the magazine ready for the next shot. The first weapon of this type was made by Borchardt in 1893. It was large and cumbersome. In the next year one was constructed by Bergmann, and this is actually the ancestor of the small flat pocket pistol of to-day, though neither of these weapons was very satisfactory. In 1898 the Mauser was produced, a large weapon provided with a wooden holster which could be fitted to the butt, converting the pistol into a small carbine. It has an effective range up to 600 yards, and was considerably used by the Boers in the S. African War. It was a very useful weapon, and is still used in the 9 mm. calibre. The Mauser was followed by the Mannlicher, a very similar weapon, but arranged to accommodate the magazine in the butt instead of in front of the trigger guard, an innovation which has been retained in this type of weapon ever since.

All pistols depend on the same principle, the recoil moving the barrel and breech block to the rear, whereby the reloading operation is effected. The cartridges are carried in a magazine in the butt, being forced upwards by a spring so that one is always in the correct position to be fed into the chamber. The weapon can be very quickly reloaded. An automatic pistol is lighter and more accurate than a revolver. Being flat, it is much more readily carried in the pocket, and can be fired three times as rapidly. The stopping power is not so good, as the small high velocity bullets may pass right through an assailant without putting him out of action, and there is a greater tendency for the weapon to jam if dirty. See Ammunition; Duel; Firearm; Revolver.



Pistoja, Italy. Façade of the 12th century cathedral. Top, right, cathedral campanile, from the Piazza del duomo

roduced, one hammer firing the barrels successively as the various priming pans were brought under it by a hand-operated mechanism. The percussion cap came into use about 1815, and by 1830 had displaced all other types of



Pistol. Ancient and modern forms of the weapon. 1. Italian dag, or short heavy piece, c. 1650. 2. German double horse pistol, with 2 sets of mechanism, 16th century. 3. Double pistol, 16th century. 4. Double pistol with single trigger actuating 2 hammers. 5. Double grip saddle pistol, with cartridge ejector. 6. Colt's Derringer single-barrelled pistol. 7. Colt hammerless automatic pistol with 6-shot magazine. 8. Mauser automatic, showing method of inserting clip of 10 rounds

Pistol. Comic character in King Henry IV, Part 2, The Merry Wives of Windsor, and King Henry V. In the first of these plays he is



Pistol declaiming against Fluellen. From an illustration to King Henry V, iv. 1, by H. C. Selous

turned out of the Boar's Head by Falstaff for insolence to Doll Tear-Sheet, and subsequently brings him news of Prince Hal's accession to the throne. In the second he is discharged from Falstaff's service for refusing to deliver a love-letter to Mistress Page, and takes his revenge by mixing as a hobgoblin with the supposed fairies, and pinching Falstaff in Windsor Park. In the third he is married to Mistress Quickly (who dies before the end of the play), and going to the war

in France is cudgelled by Fluellen, who makes him eat the leek.

Pistole. French name of an obsolete Spanish gold coin in use from the 16th century. A double escudo, it was worth about 17s. The word was generally applied to similar gold coins, e.g. the Louis d'or.

Piston. Sliding body moved by or moving against fluid pressure. It usually consists of a short cylinder fitting within a cylindrical vessel along which it moves to and fro. Pistons used in steam and internal-combustion engines make an easy running fit with the cylinder, and are provided with elastic rings, fitting in external grooves, which press outwards against the cylinder and prevent leakage past the pistons. Steam-engine pistons are usually exposed to pressure on both sides, in which case they have a length of face from back to front only one-fifth to one-seventh the diameter, being steadied by the piston-rod working through a gland at one end of the cylinder.

The trunk piston, used in most gas and oil engines for open-ended cylinders, is longer than its diameter, so as to be stable under the oblique pressure of the connecting-rod attached directly to it. In force-pumps a solid plunger is often employed instead of a piston. It passes through a water-tight gland and does not touch the walls of the pump barrel. Plungers work with less friction than pistons and leakage past them is more easily prevented when pressures are very

high. The pistons of high-speed engines should be made as light as is consistent with sufficient



Pistole. Obverse and reverse of Spanish gold coin. Actual diameter, 1½ in.

strength. See Hydraulics; Internal Combustion Engine; Motor Car; Motor Cycle; Pump.

Piston. In music, a valve applied to wind instruments for the purpose of obtaining a complete chromatic scale. The series of sounds producible by any tube has, in accordance with acoustical laws, many gaps in it, especially in the lower part of the compass, and inventors from quite early times have endeavoured to overcome this drawback. The solution was found in valves, which, by increasing the length of the tube, supplied other series as desired. The first valve lowers the pitch a tone, the second a semi-tone, the third three semi-tones, and the fourth five semi-tones. When two or more valves are depressed simultaneously the further changes of pitch can be effected. Thus any note can be obtained, and modulating passages are rendered practicable. The instruments to which pistons are applied are horns, trumpets, cornets, and the different varieties of

saxhorns. They have been tried for trombones also, but the same end is better attained by slides. Pistons used in the organ are small buttons placed below the manuals, which on being pressed actuate valves so as to effect certain combinations of stops. See Organ.

Pita (Span., aloe). Fibre from the American aloe, *Agave americana*, and other species of agave, which grow in all parts of tropical America. The fibre, variously named pita-fibre, pita-flax, pita-hemp, is tough, and is used for making twine, matting, netting, and paper. *A. rigida*, var. *sisalana* (see Sisal), gives the best fibre for ships' cables. Pita as a name is wrongly applied to *A. iztii*, of Mexico. The name pita is also sometimes given to the cariacus, a South American deer.

Pitcairn. Island in the Pacific Ocean, area 2 sq. m. It is roughly midway between Auckland, New Zealand, and Lima, in Peru. Of volcanic origin, it consists of a solitary mountain surrounded by coral reefs, and produces coconuts, bananas, oranges, yams, coffee, maize, sugar-cane, and other plants. Discovered in 1767, it takes its name from a midshipman who first sighted it. It is peopled by descendants of the mutineers of H.M.S. *Bounty* (q.v.). Great Britain formally took possession of the island in 1839, and it now has local government under the high commissioner for the W. Pacific. In religion the islanders are Seventh Day Adventists. Pop. 170. See Pitcairn's Island, W. Brodie, 1850.

Pitcairne, ARCHIBALD (1652-1713). Scottish physician and poet. Born in Edinburgh, Dec. 25, 1652, and educated at Edinburgh University and in Paris, he became the foremost physician in Scotland. In an age of Puritanism he attracted attention by his scoffing attitude towards religion, which found expression in the satirical poem on Presbyterianism attributed to him, *Babel*, and a comedy, *The Assembly, or Scotch Reformation*. He died Oct. 20, 1713.

Pitch. In mechanics, term applied to: (a) The longitudinal distance between the centres of two consecutive threads on a screw. (b) The distance between centres of adjacent teeth of a toothed wheel, measured along the pitch-line, which is a circle passing through the teeth at about half their depth. (c) The angularity of a screw propeller. A propeller of six-foot pitch would progress six feet during one complete revolution, assuming there be no slip. (d) The distance between centres of rivet holes of riveted plates.

Pitch. In music, the precise degree of gravity or acuteness of any musical sound, and depending upon the frequency of vibrations. The greater the number of vibrations per second, the higher the pitch. As commonly employed, the term denotes some standard for a given note, but there is no uniformity in this matter, and the nominal pitch has varied very much in different periods. In 1859 the French government fixed the standard for France at A=435 double vibrations per second, and in 1896 a similar standard was unofficially adopted in Great Britain of A=439 at 68° Fahr., or 435 at 59° Fahr. This is now generally used by all the principal orches-

trations to pitch. The mineral is one of the chief sources of uranium and radium, as well as of many of the rarer elements, as thorium, cerium, yttrium, polonium, etc. Though in 1789 it was shown to be largely a uranium compound, it was not till the end of the 19th century that the mineral came into prominence as a source of radium. The mineral was also the first terrestrial source of the gas helium. Pitchblende is found at Joachimsthal in Bohemia, in Hungary, in various parts of N. America, and in Cornwall. See Radium; Uranium.

Pitcher Plant (*Nepenthes*). Genus and natural order (*Nepenthaceae*) of shrubs, natives of the



Pitcairn Island. Group of women, descendants of the mutineers of the *Bounty*

tras, and by the leading pianoforte manufacturers, but unfortunately military bands still retain the former high pitch, owing to the government's refusal to incur the expense involved in procuring new sets of instruments.

Pitch. One of the products of coal tar, or one of the mixtures of hydrocarbons, which remain after the distillation of oils and fatty acids. A black, soft to hard substance, according to the temperature, it forms a viscous liquid on heating, and is used for mixing with natural asphalt, e.g. that found in the great pitch lake (q.v.) of Trinidad. Burgundy pitch is the name given to a yellowish-white resinous substance obtained from the Norway spruce fir. See Asphalt; Bitumen; Coal Tar; Tar.

Pitchblende or URANINITE. In mineralogy, an impure uranium oxide. Dark brown, green to black in colour, it has a very similar

E. tropics. They have alternate leaves, whose midrib is prolonged beyond the point and enlarged into a flask- or pitcher-shaped organ with a partly opened lid. The mouth of the pitcher is strengthened by a thick, corrugated rim,



Pitcher Plant. Example showing the hanging pitchers in which insects are entrapped

which secretes a sweet fluid, whose obvious purpose is to attract insects. From the mouth to a variable distance downwards the inner wall is polished, and affords no foothold for insects that have been attracted within. They fall into the liquid which partly fills the pitcher. This liquid has digestive properties capable of reducing boiled white of egg, raw meat, or cartilage. It digests the hosts of insects that visit the pitcher. The flowers are small and greenish. See Californian Pitcher Plant.

Pitch Lake. Famous lake of pitch in Trinidad. Situated near the S.W. coast, close to the village of La Brea, it is of circular shape, a little more than 100 acres in area and about 3 m. in circumference. Always more or less soft in hot weather, the pitch in the middle of the lake is liquid and can be seen bubbling. The annual yield exceeds 100,000 tons.

Pitchstone. In geology, name given to a glassy igneous rock, remarkable for the amount of contained water in its composition. It is lustrous, and dark grey-green, brown, or nearly black in colour. The best specimens are found in Arran in Scotland, and near Meissen in Saxony. See Obsidian.

Piteå. River of N. Sweden. It rises in two lakes S. of Mt. Sulitelma, and, flowing S.E., enters the Gulf of Bothnia in a bay containing the Isle of Pitholm. Its length is about 200 m. The small town of Piteå is on the coast some 30 m. S.W. of Luleå.

Pitesti. Town of Rumania, in Wallachia. It is 65 m. by rly. N.W. of Bukarest, and is a rly. junction on the Argesul (*q.v.*). Pop. 16,000.

Pithecanthropus erectus. Erect apeman. The systematic name was given by Eugène Dubois in 1894 to some fossil bones, including the roof of a skull, three teeth, and a thigh bone, which he discovered near Trinil, Java. The earliest anthropoid with human characters yet known, it is held to represent a collateral rather than an ancestral or missing-link stage in human development. The age of the deposits is early Pleistocene or late Pliocene. See Anthropology; Ethnology; Man.

Pithom. Store city built by the Hebrews, according to biblical tradition, for the Pharaoh of the Oppression (Exodus 1). It was the Egyptian Pa-Tum, and Naville's excavations in 1883 localised it at Tell el-Maskhuta, 11 m. W. of Ismailia. Rectangular brick structures having access only through the roof were regarded by Naville as storehouses, but by later excavators as fort-platforms. The

earliest inscriptions are of Rameses II, but evidence is accumulating that the Pharaoh of the Oppression was Thothmes III. See Egypt.

Pitlochry. Tourist resort of Perthshire, Scotland. It is on the left bank of the Tummel, on the

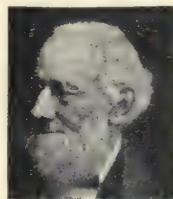


Pitlochry, Perthshire. General view, showing the hydropathic establishment

Highland Rly., 28m. N.W. of Perth. Its bracing climate and picturesque mountainous surroundings have made it a well-known summer resort, and there is a large hydropathic establishment. Tweed manufacture and distilling are carried on. Overlooked by Ben-y-Vrackie, it is at the southern end of the Pass of Killiecrankie (*q.v.*), and near by are the Falls of Tummel. Pop. 1,700.

Pitman. Name given to a connecting-rod for transmitting motion in some kinds of heavy machinery, such as stone-breakers.

Pitman, SIR ISAAC (1813-97). Inventor of the phonographic system of shorthand known as



Isaac Pitman

Pitman's. Born at Trowbridge, Wilts., Jan. 4, 1813, he became a schoolmaster in 1832 at Barton-on-Humber, whence in 1836 he went to Wotton-under-Edge, Gloucestershire, where he established a private school, and where he taught Taylor's shorthand and published his first shorthand treatise, *Stenographic Sound Hand*, 1837. In 1839 he opened a private school at Bath, where he erected a printing press, started *The Phonetic Journal*, later known as *Pitman's Journal*, in 1842, and laid the foundation of the publishing business of Sir Isaac Pitman and Sons. He was an ardent advocate of spelling reform. Knighted in 1894, he died Jan. 22, 1897. See Shorthand; consult also Lives, T. A. Reed, 1890, and A. Baker, 1908.

Pitot Tube. Apparatus devised by a French scientist named Pitot for the measurement of the speed of moving fluids or of motion through fluids. It consists essentially of one tube with an open end facing the direction of the fluid's

motion, and a second tube, also open to the fluid, but with the opening facing at right angles to the line of motion. Both tubes are thus subject to any steady static pressure on the fluid, and the first one is in addition subject

to an added pressure due to the momentum of the fluid impinging on its open end. If a delicate pressure gauge is connected with the two branches of a Pitot tube so as to register the difference of pressure between them, the reading of the gauge is a measure of the speed of the impinging fluid, if the density of the fluid is already known.

A development of the Pitot tube, known as the pitometer, is extensively used for testing the flow of water in water-mains and detecting leakages. Pitot tubes, in conjunction with pressure gauges, are extensively used in aeronautical engineering for measuring the speed of air currents in experimental work, and for measuring the air speed of aircraft in flight.

Pitt, THOMAS (1653-1726). British merchant. Born at Blandford St. Mary, Dorset, July 5, 1653, he first figures in the East Indian trade in 1675, when the company's officials resented his presence on the Hooghli as an infringement of their monopoly. Disregarding orders to leave India, he established a house at Balasor, and bought extensively for export.

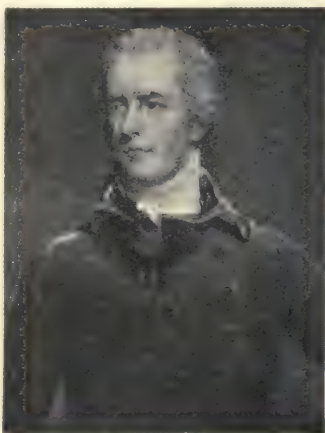


Thomas Pitt,
British merchant
After Kneller

In 1695 he joined the company's staff and was governor of Madras, 1698-1709, during which period he purchased for £20,000 the Pitt diamond, which he sold for £135,000 to the duke of Orleans. He was several times M.P. for Salisbury, Old Sarum, and Thirsk. In 1716 he was appointed governor of Jamaica, but resigned before leaving England, and died April 28, 1726. He was the grandfather of the earl of Chatham. See *Diary of William Hedges*, Hakluyt Society's reprint, ed. H. Yule, 1887-89.

Pitt, WILLIAM (1759–1806). British statesman. Younger son of the 1st earl of Chatham (*q.v.*), and his wife, Lady Hester Grenville, he was born at Hayes, Kent, May 28, 1759. A weakly child, he was educated at home until, at fourteen, he entered Pembroke Hall, Cambridge. He read the classics, and knew a good deal of English literature and something of mathematics. Although he took his degree in 1777, he remained at Cambridge until 1780, when he was called to the bar.

At the general election in Sept., 1780, Pitt was an unsuccessful candidate for his university, but was almost at once chosen (Jan., 1781) for the pocket borough of Appleby. In Parliament he associated himself with the Whigs,



After J. Hoppner, R.A.

led by Shelburne. On Feb. 26, 1781, on Burke's motion for economical reform, he made his first speech, and as an advocate of parliamentary and other reforms quickly became one of the leading figures in the House. In 1784 Cambridge returned him, and he represented the university until his death.

In July, 1782, when Shelburne became prime minister, Pitt entered office as chancellor of the exchequer, but the ministry only survived for nine months. While Portland was premier he took his place among the opposition leaders, argued again for parliamentary reform, and visited France. Before the end of the year the coalition had been defeated, and in Dec., 1783, Pitt, then 24 years of age, became prime minister, accepting the invitation he had refused the previous Feb. He himself took the office of chancellor of the exchequer, and, although some of his associates left him, he soon

formed a ministry. He had to face a hostile majority in the Commons, but the courage with which he did this heightened his reputation, especially in the country, which applauded him still more when, a poor man, he refused the rich sinecure of the clerkship of the pells (*q.v.*). The fruits were garnered in April, 1784, when the general election took place. Pitt's foes were scattered, and behind him in the new House was ranged a solid phalanx of supporters.

Pitt's long 'premiership divides itself into two periods, one of peace and one of war. From 1784 to 1792 his chief aim was to restore to his country the economic prosperity damaged by the American War. He ordered the finances, established a sinking fund, and, aided by a time of commercial expansion, made his name as a finance minister. These years were marked by the impeachment of Hastings, and the question of the regency.

Pitt as War Minister

During this time, and to a less extent later, Pitt did not receive from his colleagues in the Cabinet that support which premiers of a later age look upon as their unquestioned right. He suffered defeats in the House of Commons, not always on minor points, as when his proposals for regulating the commercial relations between England and Ireland were rejected. He showed himself true to his early zeal for parliamentary reform, although his proposals in that direction were another of his failures, and came out by the side of his friend Wilberforce in the cause of the slaves.

In 1789 the French Revolution opened, but as late as the end of 1792 Pitt did not believe that it would lead Britain into war. But from that date events moved fast. The French Republic committed one aggression after another, and in 1793 Britain entered the struggle. From then Pitt was a war minister. His high courage was specially needed in 1797, when Britain was left to continue the fight alone, and the seamen mutinied, but the fleet was soon in action again and a new coalition formed. In 1798, too, the rebellion in Ireland was crushed, and in 1800 came the union of the parliaments of England and Ireland.



Pittenweem, Fifeshire. Ruins of the priory

Pitt's Irish policy was to complete the union by granting civil liberties to the Roman Catholics. Some of his colleagues were hostile, but the decisive opposition came from the king, and Pitt resigned office in February, 1801. For two years he hardly appeared in the House of Commons, but on May 16, 1803, he returned and favoured what amounted to a renewal of the war. When this came he was again called to the helm (May, 1804). He formed a fresh coalition, and, though the Austrians were beaten at Ulm, the victory of Trafalgar restored the fortunes of the Allies. Then came Austerlitz. On the news of this defeat he returned from Bath to London, and already very ill, on Jan. 23, 1806, he died at his house in Putney. He was buried by the side of his father in Westminster Abbey. Pitt was never married.

Statesman and Orator

William Pitt ranks as one of the greatest of English statesmen and orators. Proud and reserved, he lived a somewhat lonely life, but his devotion to his country's interests was never questioned. As a war minister, sending out expeditions that were costly and valueless, and passing measures retarding the liberty of the people, he may have been less successful than he was in time of peace, but with a courage that never faltered he guided his country in a dark hour. His private life was stainless, his only weakness being a fondness for port wine, while he shared his father's lofty freedom from all taint of pecuniary corruption.

A. W. Holland

Bibliography. Political Life of Pitt, J. Gifford, 1809; The Age of Pitt and Fox, D. O. Madden, 1846; Lives, Lord Stanhope, 1862; E. Walford, 1890; C. Whibley, 1906; Lord Rosebery, 1914; Pitt and the Great War, J. H. Rose, 1915.

Pittacus (c. 652–569 B.C.). Ruler of Mitylene and one of the seven wise men of ancient Greece. A contemporary of Alcaeus and Sappho, he was largely responsible

for the overthrow of the tyrant Melanchrus, and commanded the forces of Mitylene in the war with Athens. In 589 he was chosen ruler by the people of Mitylene, and after governing wisely for ten years voluntarily resigned.

Pittenweem. Royal and mun burgh and seaport of Fifeshire, Scotland. It stands on the N shore of the Firth of Forth, 9 m. from St. Andrews, with a station on the N.B. Rly. The chief building is the parish church, originally that of a priory founded here in the 12th century. The town was made a royal burgh in 1542. Fishing and fish-curing are the chief industries, and there is a small harbour Pop. 1,900.

Pitti Palace. Building in Florence, Italy, containing a famous collection of pictures. Designed in 1449 by Brunelleschi as a residence for Luca Pitti, chief magistrate of the city, it later became the palace of the grand duke of Tuscany, and was added to and improved by successive owners. The second largest palace in Italy, it is built of rough-hewn stone, and stands on the left bank of the Arno, between that river and the Boboli gardens. The collection of paintings contains masterpieces of the Italian, Dutch, Spanish, and English schools. See Florence: Madonna Raphael. Titian.

Pitt Press. THE Name by which the Cambridge University Press (*q.v.*) was once generally known. It is derived from part of the C.U.P. buildings opened April 28, 1833, in memory of William Pitt. See History of the Cambridge University Press, 1521-1921, S. C. Roberts, 1921.

Pitt-Rivers. AUGUSTUS HENRY LANE FOX (1827-1900). British anthropologist and archaeologist. Born April 14, 1827, son of W. A. Lane Fox, he was commissioned in the Grenadier Guards, 1845, and served in the Crimean War. He

investigated rifle improvements, 1851-57, and was promoted lieutenant-general, 1882. Inheriting Dorset and Wiltshire estates from his great-uncle, George Pitt, Lord Rivers, he assumed his final name, 1880. His researches into the history of weapons led to a study of human invention, and the resulting collections, presented 1883 form the nucleus of the Pitt-Rivers museum, Oxford. He became F.R.S., 1876; vice-president of the Society of Antiquaries; president of the Anthropological Institute; and first inspector of ancient monuments. He systematically explored prehistoric remains on his estates, described in Excavations in Cranborne Chase, 1887-96. He died at Rushmore, May 4, 1900. See Woodcuts.

Pittsburg. City of Kansas, U.S.A., in Crawford co. It is 130 m. by rly. S. of Kansas City, and is served by the Atchison, Topeka and Santa Fé and other rlys. An important coal-mining centre, it has rly. workshops, grain elevators, and manufactures of foundry and machine-shop products, flour, and bricks. It was settled about 1876, and incorporated 1880. Pop. 18,100.

Pittsburg OR PITTSBURGH. City and port of entry of Pennsylvania, U.S.A. The capital of Allegheny co. and the second largest city of

the state, it occupies an advantageous position at the point where the Allegheny and Monongahela rivers unite to form the river Ohio, and is served by the Pennsylvania, the Baltimore and Ohio, and several other lines of rly. The original city was built in the angle of the two rivers, but its limits have been greatly extended by the consolidation of several neighbouring boroughs, among them being Union, W. and S. Pittsburg, Allentown, Birmingham, E. Birmingham, and Allegheny.

The prominent public buildings of Pittsburg include the Allegheny court house, a fine Doric structure crowned by a dome and connected with the gaol by a bridge; the city hall; the exposition building; the U.S. arsenal; the Carnegie library and institute in Schenley Park, opened in 1895 and extended in 1907, and containing library, art gallery, and museum; the Carnegie library of Allegheny; and the Allegheny co. soldiers' memorial hall, with large auditorium.

Pittsburg University, known as the Western University till 1908, is the chief institution for higher education. Others are the Pennsylvania Women's College, Pittsburg Academy, Duquesne University (formerly called Pittsburg College of the Holy Ghost), and the Carnegie Institute of Technology. Highland Park, 366 acres in extent, contains zoological gardens and three of the city reservoirs. The seat of a Roman Catholic and a Protestant bishop, Pittsburg has a number of fine churches.

The commercial and industrial prosperity of Pittsburg is due to its situation on a coalfield and its close proximity to an important oil and natural gas producing region. One of the principal centres in the world for the production of iron and steel goods, it has numerous large blast furnaces and rolling mills. It is actively engaged in turning out steel rails and constructing steel bridges, and other important manufactures are foundry and machine-shop products, engines, glass, bricks, cement, pottery, tobacco, cigars, electrical and astronomical appliances, and cork. In 1811 the first steamboat designed for western waters was built here, and since then ship-building has developed into a leading industry.

In 1754 the French erected Fort Duquesne on the present site of Pittsburg. The following year the fort was the objective of an advance by the British under General Braddock, but the expedition ended disastrously. In 1758 the fort was captured by the British,



Pittsburg, Pennsylvania, U.S.A. Fleet of coal lighters in the Allegheny river. Top, right, Allegheny County Memorial to soldiers who fell in the Civil War. erected in 1910

who built another fort which they named in honour of William Pitt, then prime minister of England. Pittsburg was incorporated as a borough in 1794 and reincorporated in 1804, and in 1816 it was chartered as a city. In 1845 it suffered from a disastrous fire. Pop. 588,000. See History of Pittsburg, its Rise and Progress, S. H. Kilkelly, 1906; Standard History of Pittsburg, 1908.

Pittsfield. City of Massachusetts, U.S.A., the co. seat of Berkshire co. It stands on the Housatonic river in the mountain-girt Berkshire valley, 41 m. N.W. of Springfield, and is served by the New York, New Haven and Hartford, and the Boston and Albany rlys. It has silk, woollen, and paper mills, foundries and machine shops, and manufactures of cotton, thread, paper, and pianos. Settled in 1743 and resettled in 1749, Pittsfield was incorporated in 1761 and became a city in 1891. Pop. 41,800.

Pittston. City of Pennsylvania, U.S.A., in Luzerne co. It stands on the Susquehanna river, 10 m. S.W. of Scranton, and is served by the Lehigh Valley and other rlys. It is a centre of the anthracite coal-mining industry, and manufactures foundry and machine-shop products, stoves, paper, silk and knitted goods, and bricks. Founded in 1768 and named in honour of William Pitt, Pittston was incorporated in 1855 and became a city in 1894. Pop. 18,500.

Pituitary Body (Lat. *pituita*, phlegm). Small lobed gland which lies at the base of the brain. It secretes a substance, the precise nature of which is not known, but which exercises important functions and is essential for life. Experiments with animals have shown that removal of the pituitary body is fatal in a few days. Excessive activity of the gland causes over-growth of the bones. Diminished activity leads to excessive formation of fat throughout the body.

Pit-Village. Prehistoric settlement, mostly of the neolithic and the early metallic age. The transition from the palaeolithic cave-dwelling (*g.v.*) to the neolithic pit-dwelling is traceable at Campigny, France, in S. Russia, and in Holderness, Yorkshire, where excavations in the boulder-clay were sometimes 40 ft. long. Other sites reveal pits for storage and other domestic purposes beneath the flooring of wattled huts, long since perished. Similar structures are found among the Eskimo and on ancient settlements in New Zealand, and in Hokkaido, Japan. See Hut Circle; Underground Dwellings.

Pityriasis (Gr., scurf, from *pytyron*, bran). Name given to several affections of the skin. *P. capitis*, dandruff or scurf, is a chronic parasitic affection of the scalp characterised by the formation of easily detached scales or scurf, leading to atrophy of the hair. The condition may begin as early as the sixth year. In some persons there may be formation of dry scales for years; in others greasy scales are formed with earlier shedding of the hair. *P. circinata* is associated with *P. capitis*. Pink spots tend to appear in the middle of the trunk and on the back. These enlarge and clear up in the centre, forming rings, the margins of which become covered with greasy scales.

The treatment of *P. capitis* demands shampooing at regular intervals of two or three weeks. For the shampoo a lotion consisting of soft soap and spirit in equal parts with ten grains of thymol to the ounce may be used. For *P. circinata* an ointment containing sulphur has been found most useful. *P. rosea* is an eruption of rose-coloured spots on the trunk and upper parts of the limbs, the cause of which is unknown. It is more common in the young than in the elderly, and in females than in males. After lasting from four to six weeks, the spots fade and the skin gradually resumes its normal appearance. *P. rubra* is an eruption of red, scaly patches, which tends to begin in the flexures of the body, and gradually spreads until the whole surface is more or less involved. It is a very chronic disorder, and the patient often dies from tuberculosis.

Piura. Northernmost maritime dept. of Peru. Partly a rainless desert, it yields petroleum, salt, sulphur, and soda. Its area is 16,825 sq. m. Pop. 213,900. Piura, the capital, stands on the Piura river, 20 m. from the coast, and 40 m. by rly. E. of Paíta. The first permanent settlement founded by Pizarro, it is an important cotton mart, and exports petroleum and cotton. Pop. 14,000.

Pius. Name of eleven popes, of whom the more important are noticed separately. Pius I, the 9th pope according to the earliest lists, whose pontificate was from about 140 to 154, is venerated as a saint and martyr, his festival being kept on July 11. Pius III, pope for a few weeks in 1503, was a Piccolomini, and nephew of Pius II. Pius VIII, pope 1829-30, was the candidate of the French and Austrian monarchies. He recognised the revolution which made Louis Philippe king of France.

Pius II (1405-64). Pope from 1458-64. Aeneas Sylvius Piccolomini was born at Corsignano,



Pius II,
Pope, 1458-64

Oct. 18, 1405, of a noble but impoverished Siennese family. He studied at the university of Siena, and as private secretary to the bishop of Fermo, attended the council of Basel in 1432, where he joined the faction opposed to Pope Eugenius IV. Later, he entered the service of cardinal Albergati, who took him on various journeys and in 1436 sent him on a mission to Scotland.

Returning to Basel he took an official part in the election of the anti-pope Felix V, 1439, and became his secretary. He left Basel, and at Vienna entered the service of the emperor, Frederick III, and having deserted the anti-pope, was in 1445 formally reconciled to Eugenius IV. In 1446 he was ordained, in 1447 was made bishop of Trieste, in 1450 bishop of Siena, and, created cardinal in December, 1456, was elected pope in succession to Calixtus III. To unite Europe against the Turkish menace, he summoned a meeting at Mantua, where he issued his bull (*Execrabilis*), Jan., 1460, in which appeals from the pope to a general council were condemned.

The last act of the pope's life was an attempt to lead in person a crusade against Islam. A man of letters and humanist learning, Pius II died at Ancona, Aug. 14, 1464. See Piccolomini; consult also Pius II, C. M. Ady, 1913.

Pius IV (1499-1565). Pope from 1559-65. Born at Milan of a branch of the Medici family, Gio-



Pius IV,
Pope, 1559-65

vanni Angelo studied at Pavia and Bologna, and in his 28th year gave up law to take orders. He was employed in various offices under Clement VII, Paul III, and Julius III, and was made cardinal by Paul III. In 1559 he was elected pope. On his summons the council of Trent re-assembled for the third time, Jan., 1562, and sat until Dec., 1562. He died on Dec. 9, 1565.

Pius V (1504-72). Pope from 1566-72. Born in Lombardy, Jan. 17, 1504, his name was Michele

Ghisleri. Entering the Dominican Order, he was ordained, was made bishop of Sutri, 1556, inquisitor general and cardinal, 1557, and elected pope, 1566. He excommunicated Elizabeth and encouraged Mary Queen of Scots. He was no less active in strengthening the work of the Inquisition, and in his opposition to the Turks. He was canonised in 1712, his festival being kept on May 11. *See* Lepanto; consult also *Life* and *Pontificate*, J. Mendham, 1832.



Pius V,
Pope, 1566-72

Pius VI (1717-99). Pope from 1775-99. Born at Cesena, Dec. 27, 1717, his name was Giovanni Angelico Braschi. From 1755 until his election as pope he held various official positions at Rome. His reign was a continuous struggle first with the Catholic rulers of Austria, Spain, and Naples, and later with Napoleon. At the French Revolution Pius VI refused to acknowledge the civil constitution



Pius VI,
Pope, 1775-99
After G. Eichler

of the clergy, 1791, and France annexed the papal territory at Avignon. After surrendering large portions of the papal states to Napoleon, 1797, the pope declined to acknowledge the Roman republic, set up in 1798. Carried an exile to France, he died at Valence, Aug. 29, 1799.

Pius VII (1740-1823). Pope from 1800-23. The son of Count Scipione Chiaramonti, he was born at Cesena, Aug. 14, 1740, and

after some years as a Benedictine monk was made bishop of Imola, and cardinal 1785. He was elected pope in 1800 after a three months' conclave. The great event of his reign was the concordat with Napoleon I, 1801. Pius was subsequently made prisoner by Napoleon, and was a captive 1809-14. By the aid of Consalvi at the Congress of Vienna he obtained the restoration of the papal states. He also re-established the Jesuit Order,



Pius VII,
Pope, 1800-23
After Lawrence

1814. He died Aug. 20, 1823. *See* Concordat; Consalvi; consult also *Life*, M. H. Allies, 1897.

Pius IX (1792-1878). Pope from 1846-78. Born at Sinigaglia, May 13, 1792, his name was Giovanni Mastai-Ferretti. Ordained in 1819, he was made archbishop of Spoleto, 1827, and created cardinal, 1840. He was elected pope on the death of Gregory XVI by the faction which favoured liberal reforms, the Austrian veto on his election arriving too late. His first act was a general amnesty to all political prisoners. This was followed by a constitution for the papal states, but on his declaration against war with Austria a series of riots in Rome ended in the pope's retirement, 1848, and the establishment of a republic. Restored by French troops, 1850, Pius IX saw the annexation of the papal states and of Rome to the Kingdom of Italy in 1870; in 1870, too, he convoked the Vatican Council which declared the pope speaking *ex cathedra* to be infallible in faith and morals. He died Feb. 7, 1878. *See* Lives, A. O. Legge, 1875; T. A. Trollope, 1877; Rome: Its Rulers and Institutions, J. F. Maguire, 1878.



Pius IX,
Pope, 1846-78

Pius X (1835-1914). Pope from 1903-14. Born at Riese, in Venice, the son of a postman, his name was Giuseppe Melchiorre Sarto. Educated in the seminary of Padua, he was ordained, 1858. He was made canon of Treviso, 1875, bishop of Mantua, 1884, and cardinal archbishop of Venice, 1893. On the death of Leo XIII he was elected pope by 55 votes out of 60. The pontificate of Pius X was distinguished for the attention given to increasing the discipline of the church and suppressing modernism. In his encyclicals of 1907 and 1910 the whole system of modernism was condemned. He died Aug. 20, 1914. *See* Life, F. A. Forbes, 1918.



Pius X,
Pope, 1903-14

Pius XI (b. 1857). Pope. He was born May 31, 1857, at Desio, in the prov. of Milan, his name being Achilles Ratti. Ordained in

1879, he was for many years prefect of the Ambrosian library at Milan. He visited England in 1900 and engaged in research work at the Bodleian Library, Oxford. Ten years later he was transferred to the Vatican library, becoming prefect. After being Apostolic nuncio in Poland, he received cardinal's rank in 1921, and was appointed archbishop of Milan. On the death of Benedict XV he was elected pope, and took the name of Pius XI, Feb. 6, 1922. He was credited with an earnest desire to bring about world pacification.



Pius XI,
Elected Pope, 1922
Manuel

Pi y Margall, FRANCISCO (1824-1901). Spanish writer and statesman. He was born at Barcelona, April 29, 1824. One of the foremost of modern critics, and a confirmed republican in politics, he was elected president of the democratic federal republic of 1873. Among his numerous works is a monumental General History of America. He died at Madrid, November 29, 1901.

Pizarro, FRANCISCO, DON (c. 1475-1541). Conqueror of Peru. The natural son of Colonel Gonzalo Pizarro, he was born at Trujillo, Spain, and entered the Spanish military service early, fought under Gonsalvo de Cordova in Italy, and then sought fresh fields for his energies in the newly discovered lands in the Far West.

Fired with ambition by the conquest of Mexico (*see* Cortes), 1520, Pizarro conceived the idea of conquering Peru, the unexplored empire of the Incas, and in 1526 went with a fellow adventurer, Almagro, on a first voyage of investigation. They received little countenance from the governor of Panama, but Pizarro learnt that the rumours which had reached Spain were true, and that there actually existed a highly organized empire, immensely rich, and enjoying an advanced civilization. The next step was to obtain authority for the conquest from Charles V. This accomplished, Pizarro sailed from Panama on Dec. 28, 1531, with 183 men, armed with muskets.

Pizarro landed in May, 1532, at Tumbes. The crown of the Incas had been seized by Atahualpa, who had deposed the legitimate ruler, Huascar. In Nov. Pizarro reached the town of Cajamarca, which he found empty, while he learnt that

Atahualpa was in the neighbourhood with an army of 40,000 men. To attack him openly with less than 200 men was out of the question, but Pizarro posted his men and his two culverins carefully in Cajamarca, and enticed Atahualpa to visit him in state. At a given signal the Inca king was seized, the Spanish guns opened fire, and the handful of Spanish horse threw themselves between the king's company and the line of communication with the main army. The ensuing fight was merely a massacre. Atahualpa submitted and promised the Spaniards a vast store of treasure if they would restore to him the authority under which they were now professing to act. Nevertheless, fearing internal revolution, he gave orders for the execution of his brother Huascar. Pizarro seized his opportunity; Atahualpa was denounced and executed; while another member of the royal family was set up as a puppet emperor.

Almagro was now arriving with reinforcements. The empire was partitioned, Pizarro taking the northern governorship while Almagro went south and made himself master of Chile. No effective resistance was offered to the conquerors until an Indian insurrection broke out in 1536. It was crushed next year by the aid of Almagro, between whom and Pizarro there then arose a contest for supremacy. Pizarro's brothers defeated and killed Almagro in 1538, but three years later Almagro's followers took their revenge, and Pizarro was surprised and assassinated on June 26, 1541. See *Atahualpa*; *Lima*; consult also *Life of Pizarro*, with account of his Associates, A. Helps, 2nd ed. 1869.

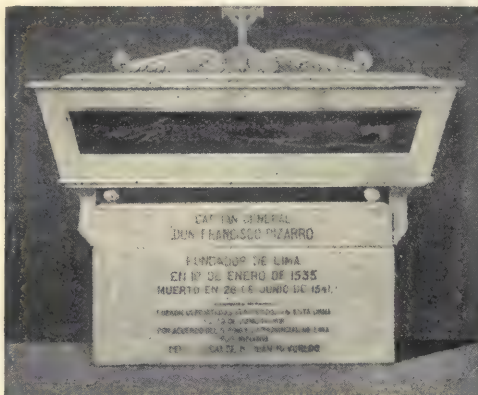
Pizzicato (It., pinched). Effect produced on string instruments by plucking the strings with the fingers, the resultant sound having a dry and evanescent quality of tone. See *Harp*.

Placard (Fr., from *plaquer*, to plaster). Originally, an official or public document, under seal, and corresponding to a licence. Hence, an edict, proclamation, or notice, posted up in a public place, and, generally, a bill or poster. Placard or placart was the name of a plate of armour worn over or under the cuirass; also, in the 15th and 16th centuries, of an article of dress.

Place Bill. Name given in England to a measure designed to exclude placemen, i.e. holders of office under the crown, from Parliament. The first of many was introduced in 1692, but none of them has become law.

Place Names. Geographical and topographical designations. Their study, long the sport of amateurs, was hardly placed on a scientific basis until the 20th century. A branch of philology, it is a valuable aid to the historian and ethnologist, elucidating the movements and boundaries of nations and tribes. In all ages curiosity about place names has given rise to popular etymologies, e.g. Gen. xi, 9. Legends arise through mistaken derivations, as with Pilatus (*q.v.*); Maidenhead, connected with a story of a martyred virgin, but probably meaning timber wharf or hithe. It is seldom safe to guess the mean-

countries, occur rarely in England. Most other remaining English place-names are plain prosaic descriptions of the locality. Among the commonest endings are *caster*, *cester*, *chester*, Roman fortress; *ton*, enclosed settlement; *ham*, homestead (sometimes pasture); *wick*, *wich*, village; *bottle*, building; *stead*, place; *thorp*, *trop*, village; *worth*, *worthy*, *wardine*, holding or farm; *stow*, place; *ern*, house; *hope*, enclosure, also hollow; *hall*, *haugh*, river meadow; *holm*, *lea*, *ley*, meadow; *hurst*, wood; *den*, wooded valley; *combe*, valley; *borne*, *bach*, *beck*, brook; *bergh*, *don*, *low*, *law*, hill; *or*, *over*, *er*, bank; and words like wood, field, ford, stone, cot.



Pizarro. White marble urn with glass front, in the cathedral of Lima, Peru, where the remains of Francisco Pizarro were placed, June 28, 1891

ing from the modern form. Thus, Bridgewater means Burgh Walter; Strangeways, stiff mud; Slaughterford, sloe-tree ford; while Milford and Fairfield are probably Norse names, meaning sandy fiord and sheep fell.

While in Germany place names show the limits of Celtic and Slav settlement, in Spain we can trace the Iberians, Celts, Phoenicians, Romans, Goths, and Arabs by such names as Bilbao, Sigüenza, Cadiz, Zaragoza, Burgos, and Guadalquivir respectively. In England a few river names are probably pre-Celtic, but most are Celtic, e.g. Avon, Exe, Dove, Adur, Wey, Thames, etc., as are many names of hills, Penygant, Brown Willy, Helvellyn, etc., and towns like London, Dover, York.

The great majority of English names of towns and villages contain the name of the man or family that founded the settlement, e.g. Brighton, Brihtelm's stone; Hildersham, Hilderic's home; Hoxton, Hocca's enclosure. Family or tribal names end in the patronymic *-ing*, as in Dorking, Kettering. The names of saints, exceedingly common in Celtic

Norse names end in *by*, *thorp*, village; *toft*, farm; *argh*, *ergh*, shelter; *thwaite*, clearing; *with*, wood; *dale*, valley; *beck*, gill, stream; *force*, waterfall; *keld*, child, spring; *wick*, creek; *forth*, fiord; *holm*, *y*, *ay*, island; *fell*, mountain, *how*, mound. The Norman-French element is represented by such names as Bungay, *bon gué*, good ford; *Grampound*, *grand pont*, great bridge; *Belper*, *bel reiper*, fair resort; *Bewdley*, *beau lieu*, fair place. The name of the Norman owner was often added to that of the village, e.g. Hucknall Torkard. See *Name*; consult also *British Place-names in their Historical Setting*, E. McClure, 1910; *The Place-names of England and Wales*, J. B. Johnston, 1915.

A. B. Gough

Placenta (Lat., cake). Mass of tissue adherent to the inside of the uterus or womb and connected, for nutritive purposes, by the umbilical cord with the foetus or growing organism. It is also called the after-birth. See *Obstetrics*.

Placentic Bay. Deep inlet of Newfoundland. It is on the S. coast and is 75 m. long and 60 m. across its entrance. A long, narrow isthmus separates it from Trinity Bay. The chief harbour is Placentia. See *Newfoundland*.

Placer. Name given to alluvial gravel in which gold and tin ore deposits occur very frequently. Gold occurs in the metallic form in placers, while tin occurs as cassiterite (tin dioxide). Placers are divided into two classes, superficial and deep-lying. The former are recent and owe their origin to

the action of rivers which may still exist, whilst the latter have been formed by the action of extinct or ancient rivers; in either case the contained mineral is derived from the disintegration of metalliferous veins (primary deposits).

Deep-lying alluvials or placers are worked by ordinary methods applicable to the exploitation of bedded mineral deposits, such as coal. Superficial deposits are worked by a variety of methods. Panning is carried out by hand in a pan about 16 ins. diameter, the gravel being washed away by water, the mineral, being heavier, remaining in the pan. See Hydraulic mining; Gold; Mining.

Placoid Fishes (Gr. *plax*, flat plate). Name sometimes given to the Elasmobranchs, a group of cartilaginous fishes which includes the shark, dog-fishes, and rays. See Elasmobranch.

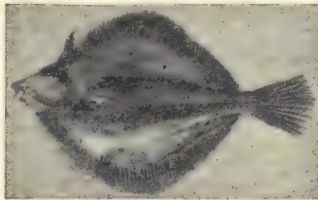
Plagioclase. In geology, a group of triclinic feldspars. The plagioclases form the chief constituents of igneous rocks, and appear also in many metamorphic rocks. The rocks of this group are described in this Encyclopedia under their respective names, e.g. albite, andesine, anorthite, labradorite, oligoclase, etc. They are valuable in the study of rocks, their optical properties serving as an index for the study of thin sections of rocks of all kinds under the microscope. See Feldspar.

Plague (Lat. *plaga*, stroke). Term formerly applied to epidemics of various diseases, but now restricted to the disease caused by the *bacillus pestis*. The disease has been known in epidemic form at least from the 6th century. In the 14th century a devastating outbreak known as the Black Death occurred in Europe, and is estimated to have swept away one-fourth of the population. In the Great Plague of London, 1665-66, some 70,000 persons perished. Since that date epidemics in Europe have declined. In 1894 there was a severe outbreak at Hong Kong, following which the disease spread through large areas of India, China, Japan, Australia, South America, the West Indies, Madagascar, Egypt, and Russia, while cases occurred in Marseilles, Hamburg, and Glasgow. At the present day the regions in which the disease is endemic are Mesopotamia, Northern India, Tibet, and Yunnan in China.

Plague is, in the first instance, a disease of rats, and the infection is conveyed from the rat to man solely by the rat flea, which, after biting an infected rat, bites a human being. The disease may be

conveyed from place to place by rat fleas carried in merchandise or on human beings. Four main forms of the disease are recognized. The ambulatory type is the mildest form, the symptoms being rise of temperature, lasting for a few days, and swelling of the glands of the groin, which may pass on to suppuration.

The bubonic form constitutes some three-quarters of all cases. The initial symptoms are headache, pain in the back, stiffness of limbs and restlessness. The temperature rises and severe prostration occurs. Death may take place at this stage, but in most cases swellings known as buboes appear, affecting the glands of the groin, the axilla, and the neck. These usually suppurate. Haemorrhages under the skin may occur; these were known as "plague spots" in the Middle Ages, and gave the disease its name of Black Death. The patient may become delirious and death occurs from the third to the fifth day. In favourable cases the temperature declines gradually,



Plaice viewed from above, showing position of both eyes on upper side

but convalescence may be prolonged owing to the suppuration of the buboes. In the septicemic type the signs of blood poisoning are very severe, and the patient may die in from three to four days, before the buboes have appeared. In the pneumonic form of plague shortness of breath, cough, and pain in the chest are among the early symptoms, and signs of pneumonia develop. Death may occur as early as 16 hours after the appearance of the symptoms.

No drug has any appreciable effect on the disease, but a serum has been prepared which is beneficial in some cases. High fever may be treated by cold sponging. Prevention of plague is an important necessity in areas liable to be infected. The most essential step is to take energetic measures against rats by their systematic destruction. Houses should be made rat-proof. Ships arriving at port should be fumigated to destroy rats. The risk of acquiring the disease in infected areas has been reduced by means of Haffkine's prophylactic vaccine. See Black Death; Great Plague; Rat

Plagues of Egypt. Ten plagues brought upon the Egyptian Pharaoh and his people by Jehovah, when the Israelites were in bondage in Egypt (Exod. vii, 14-xii). The plagues were turning of the waters of the Nile to blood; swarms of frogs, of gnats, of flies; affliction of cattle with pestilence; of man and beast with boils and blains; havoc by thunder and hail; swarms of locusts; dense darkness; and, the last and most terrible, the death of the first-born of man and beast.

Plaice (*Pleuronectes platessa*). Important food fish of the family Pleuronectidae. A native of the Atlantic and North Sea, from Iceland and N. Europe, to the Bay of Biscay, but not on the American coasts, it is also found rarely in the Mediterranean. Of a long, oval form, the body of the plaice is strongly compressed from side to side, and fringed with the long dorsal and ventral fins, which extend almost from head to tail. The left side is white without any markings, but the right, or upper side, is fully coloured brown, on which are scattered spots of orange or red.

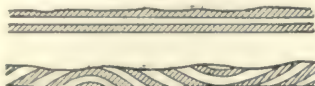
Beginning life as a "round" fish, like the cod, the young plaice soon takes to lying on the bottom on its left side, and the left eye travels round to the right side. The young flat-fish affects sandy shores in shallow water, going deeper as it gets larger, until as an adult it seeks the spawning grounds in from 10 to 40 fathoms. It is adult when from 2½ to 3 years old, and 10 to 12 ins. long, but if it escapes the trawl may grow to 24 to 30 ins. Its principal food consists of small molluscs, sand stars and marine worms. The average egg-production of a female plaice is a quarter of a million, though nearly twice this number have been recorded. The eggs, which measure ⅓ of an inch, float a little below the surface. See Fisheries.

Plaid (Gael. *plaid*, blanket). Strip of cloth two yards broad and four yards long, once used as a garment by Scotsmen, and known as the *breachan feilidh*. See Highland Dress; Tartan.

Plain (Lat. *planus*, flat). Area of flat or approximately flat land. Plains may be classified according to their formation, as plains of accumulation and plains of erosion.

Plains of accumulation are built up of sediment which forms horizontally bedded layers of rocks, so that in these plains the surface corresponds to the structure. The sediment brought down by rivers, or produced by wear and tear of the coast, is spread over the floor

of the ocean bordering the land masses. An uplift of the land will raise accumulated deposits above sea level, and produce coastal plains like those stretching along the N. American coast from Mexico to the Hudson River. In the interior of the same continent are vast prairie plains, composed of



Plain. Sectional diagrams illustrating (top) accumulation, and (below) formation of plains of erosion

limestone built up of sediment deposited on the bed of the ancient sea formerly separating the western highlands from the eastern highlands. Uplift raised these deposits and formed plains. The vast S. American lowlands of the Plate, Amazon, and Orinoco valleys, the steppes of Hungary, Russia, and W. Siberia, have all been formed in this manner. Other plains of accumulation are chiefly associated with rivers, many of which accumulate sediment in the form of deltas.

Plains of erosion do not necessarily correspond in surface and in geological structure, for they are frequently ancient folded and contorted highland regions which have been reduced to rough plains, or peneplains (*q.v.*), by erosion. In the Baltic or Hudson Bay areas there are good examples of plains of erosion. Sometimes they are covered by alluvial and other deposits.

Plainfield. City of New Jersey, U.S.A., in Union co. It is 24 m. W.S.W. of New York, and is served by the Central Railroad of New Jersey. Manufactures include silk and cotton goods, printing presses, lumber products, gloves, etc. Founded in 1847, Plainfield became a city in 1867. Pop. 27,700.

Plainsong, PLAIN-CHANT, OR CANTO FERMO. Ancient system of Gregorian church music. It proceeded by contrapuntal movement in notes of equal length, representing what is now known as the first species of counterpoint. It was written in the eight modes, and on four-lined staves, the notes employed being the long, the breve, and the semibreve. The Canto fermo, generally in the tenor part, was the foundation on which the counterpoint was built, though each part was supposed to be of equal interest. The form is still used in Roman Catholic and high Anglican churches, chiefly, however, in the solo verses sung by the officiating celebrant, without contrapuntal additions. See Gregorian Chant.

Plain Tales from the Hills.

Volume of short stories of Indian and Anglo-Indian life by Rudyard Kipling, first published in Allahabad, in 1887. Most of the tales had previously appeared in the Lahore Civil and Military Gazette. It was the first volume of his stories to be issued in book form.

Plaintiff (Fr. *plaintif*, one who laments, complains). In English law, like pursuer in Scots law, the term describes the actor, or person who brings another, called the defendant, into court, seeking relief against him. The plaintiff in a divorce action is called the petitioner. See Trial.

Plasterers' Company, THE. London city livery company. Existing as a guild in earlier times, it received its first charter March 10, 1502. The hall at 23, Addle Street, Aldermanbury, E. C., destroyed by fire in 1666, was rebuilt by Wren. The office is at 22, Bedford Row, W. C.



Plasterers' Company arms

Plaistow. Dist. of Greater London. In the co. of Essex, between West Ham, N., and Canning Town, S., it is 4½ m. from Fenchurch Street station, on the G.E. and Mid. Rlys. At the beginning of the 19th century a small village, and noted for its marshes, and the residences of members of the Society of Friends, it is now a crowded industrial suburb, and has many chemical, engineering, and other works. Here are the West Ham Smallpox and Fever Hospital, 1880, and the Red Triangle Club, a war memorial, opened June, 1921, at a cost of £80,000. The East London Cemetery, 43 acres, opened 1872, is here, and the dist. is crossed by the northern outfall sewer. The park of Samuel Gurney's mansion is a public recreation ground. Edmund Burke was a resident. Pop. 35,240. There is another Plaistow, W. of Sundridge Park, in Kent, and one in West Sussex.

Planarians (*Tricladida*). Suborder of Turbellarian worms. Of elongated, flat, or cylindrical form,



Planchette, as employed in automatic writing

covered with vibratile cilia, and with the mouth near the middle of the underside, they are all carnivorous, feeding upon other worms, molluscs, or insects. There are three families—*Maricola* (marine); *Paludicola* (fresh-water); and *Terricola* (land). The *Maricola* are broad and leaf-like, often brightly coloured, and as much as 6 ins. long, and may be found gliding over seaweeds or swimming by means of their cilia. A familiar example of the fresh-water forms is a small, black species (*Polycelis nigra*), abundant in stagnant water, ¼ to ½ in. in length, popularly regarded as a young leech. A remarkable example of the land planarians (*Bipalium kewense*) was discovered in Kew Gardens some years ago, to which it had been introduced accidentally with tropical plants. It is 6 ins. or more in length, and can extend to 18 ins. Getting a portion of a large worm into its mouth, it will stretch its entire integument over its victim, the operation taking from one to five hours, but the meal may support it for several months. See *Platyhelminx*; *Worm*.

Planché, JAMES ROBINSON (1796–1880). British dramatist and antiquary. Born in London of



Huguenot ancestry, Feb. 27, 1796, he early developed a taste for the stage, and at the age of 22 achieved some success with a burlesque,

Amoroso, King of Little Britain, produced at Drury Lane. At Charles Kemble's revival of *King John* in 1823, Planché designed the costumes. He wrote, translated, or adapted for the stage over 150 pieces in all, largely burlesques. In 1854 he was made *Rouge Croix*, and *Somerset Herald* in 1866. Among his works, apart from dramatic writings, are *History of British Costume*, 1834; *The Pursuivant of Arms*, 1852; *The Conqueror and His Companions*, 1874; *Cyclopaedia of Costume*, 1876–79. He died May 30, 1880.

Planchette. Small wooden tablet, usually heart-shaped, mounted on three legs. One of these is a pencil and the others terminate in small wheels, the whole being so contrived that, when placed on a sheet of paper, it moves at the slightest impulse, and the pencil makes marks. It is frequently employed in experiments in unconscious muscular movement,

and by spiritualists as a medium for communication with the unseen world. Two persons place their fingers lightly on the planchette, keeping their hands still and their minds passive, and in a few moments the instrument will usually begin to move and often trace words and sentences. See Spiritualism.

Plane (Lat. *planus*). Word meaning flat, level, or even. In aeronautics, it is used as a contraction for aeroplane, and also for the wing surfaces of an aeroplane. In mathematics, plane geometry is concerned with the geometry of plane figures, i.e. figures which lie wholly in surfaces determined by any three points not in a straight line. In joinery, a plane is a tool used for smoothing the surfaces of wood, or for cutting certain types of grooves, etc. It is a chisel held by a wooden or metal stock at an angle to the surface being smoothed. There are many varieties, named according to their shape, use, etc., e.g. jack plane, routing plane, tonguing or grooving plane. A plane is also a kind of trowel used in various trades to smooth or surface sand or clay.

Plane (*Platanus*). Small genus of large trees of the natural order Platanaceae, natives of the N. temperate regions. They attain a height of 70 to 90 ft., with a trunk circumference of 10-12 ft., which is occasionally exceeded greatly. The large alternate leaves are palmately divided into five or seven toothed and sharply pointed lobes, and the dilated base of the leaf-stalk is hollow, fitting over the resting-bud of next year's shoot.

The flowers are simple, without sepals or petals, and the sexes separate; they are clustered in spherical heads, the male heads on one branch, the females on another. The fruits are closely packed in spiky balls which hang on long strings through the winter and disintegrate in spring. A peculiarity of the tree which helps it to thrive in soot-laden atmospheres is its habit of throwing off the outer layers of its bark in large or small thin flakes, showing yellow patches of newer

bark. The Oriental plane (*P. orientalis*) was introduced to England from the Levant at some date previous to 1548, and the Western plane (*P. occidentalis*) from Virginia about 1640. The maple-leaved plane (*P. acerifolia*) is believed to be a hybrid between the two, originating in the Oxford Botanic Garden about 1670. The wood of *P. orientalis* is used for carpentry and cabinet work, and is susceptible of a high polish; but that of *P. acerifolia* is of less value, being liable to warp.

Planet (Gr. *planētēs*, wanderer). Name given to the chief of the solid bodies that revolve around the sun. Asteroids or planetoids and meteors are not usually included. The planets are Mercury, Venus, Mars, Earth, Jupiter, Saturn, Uranus, and Neptune.

In the solar system the planets are generally divided into two groups, the inferior planets, those between the earth and the sun, and the superior planets, those farther away from the sun than the earth. All planets travel round the sun in an anti-clockwise direction, looking down on the system, and all orbits are elliptical. The plane in which the earth revolves is known as the plane of the ecliptic, and all the other planets re-

volve in planes which only make small angles with the ecliptic plane.

The relative sizes and distances of the planets have been clearly drawn in analogy by Sir Norman Lockyer. By this analogy the sun is a globe 2 ft. in diameter, Mercury a grain of mustard seed 164 ft. away, Venus a pea in an orbit of 284 ft., the earth a pea 430 ft. distant, Mars a pin head 654 ft. away, Jupiter an orange at a distance of half a mile, Saturn a smaller orange four-fifths of a mile away, Uranus a small plum $1\frac{1}{2}$ m. away, and Neptune a larger plum at $2\frac{1}{2}$ m. The earth is the densest of all planets, Saturn being only one-eighth, and Neptune one-fifth as dense. The density of the earth is about $5\frac{1}{2}$ times that of water.

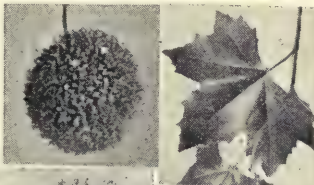
In astronomical tables, almanacs, etc., symbols are given to the names of various planets and the sun and moon for convenience of tabulation, etc. These symbols are: Mercury, ☿; Venus, ♀; Earth, ☾; Mars, ♂; Asteroids, ♂ ① ② ③ according to the order of their discovery; Jupiter, ♃; Saturn, ♄; Uranus, ♅; Neptune, ♆.

There is considerable uncertainty whether there are other planets not yet discovered. The irregularity of movements of Mercury caused Leverrier to postulate an inter-Mercurial planet, and the perturbations of Neptune have caused many investigators to compute the masses and distances of extra-Neptune planets. These planets, however, have not yet been discovered.

The planetismal hypothesis is one which derives the origin of the planets from the collision of two stars, instead of from the condensation of a disk-shaped nebula. The hypothesis was suggested by T. C. Chamberlain. See Asteroids; Astronomy; Cosmogony; Earth; Jupiter; Nebula; Neptune; Saturn; Solar System; Sun; Zodiac.

Planetarium. Machine designed to exhibit the movements of the planets and other bodies of the solar system. It is practically a working model, and was at one time popular for the purpose of demonstrating the relative movements of the members of the solar system. See Orrery.

Planimeter (Lat. *planum*, level ground; Gr. *metron*, measure). Instrument for measuring the areas of plane figures. Used practically only for measuring irregular figures, the first planimeter was invented in 1814 by Hermann, a Bavarian engineer. The best known modern planimeter is that known as Amsler's. Its essential features are two movable arms, A and B, on the extremity of one of which



Plane. Fine specimen of this tree. Top, left, fruit of London plane and, right, leaf

is a pointed support E, and on the other a pencil or tracing point, F. The latter arm has on it a graduated cylinder, D, which rolls round as the tracing pointer is moved along the perimeter of the area to be measured. A vernier, H, and a horizontal disk, G, worked in conjunction with D, enable the area of the figure to be measured or calculated. See Vernier.

Plankton (Gr. *planktos*, wandering). Term used for the drifting or swimming organisms of lakes, rivers, and seas. The plankton of the latter is the basis of oceanic life, and the term was first used by Victor Hensen to indicate those organisms which were at the mercy of every current, their swimming powers being too feeble to make any headway against a flow of water. The colour of certain seas is entirely due to these minute organisms, which include plants as well as animals, and exist in countless myriads. The study of the distribution of plankton is important, for the organisms are the basic food supply of many fish, e.g. herrings, whose migratory movements can be consequently better understood. Plant plankton includes diatoms, algae, etc., and animal plankton the jelly fishes, foraminifera, radiolaria, siphonophora, certain crustacea, etc. See Nekton.

Planquette, ROBERT (1848-1903). French composer. Born in Paris, July 31, 1848, he studied at the Conservatoire there. He composed a large number of operettas, including *Les Cloches de Corneville* and *Rip van Winkle*, which gained much popularity in both France and Britain. Other operettas included *Nell Gwynn* and *The Old Guard*. He died in Paris, Jan. 28, 1903.



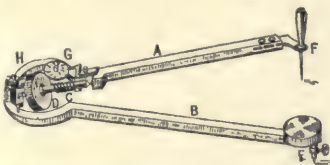
Robert Planquette,
French composer

Plant (Lat. *planta*, sucker or shoot). Word usually indicating in its everyday popular use a herb. In the broader botanical sense, however, it covers all vegetable organisms, not only trees, shrubs and herbs, but the ferns, mosses, liverworts, seaweeds, fungi, and even the minute single-celled organisms that are so like the simplest forms of animal life. Just as the higher animals have well-recognized divisions of the body, as trunk, head, and limbs; so the higher plants have equally distinct parts, as root, stem, leaves, flower, and fruit. All these parts are sub-

ject to considerable modification, and upon these they are classified into orders, genera, and species.

The root as a rule burrows into the earth and bears no leaves, its functions being to attach the plant, and to provide it with water and mineral salts for food. The stem takes a more or less upward direction above the soil and bears leaves. It may be composed entirely of soft cells and easily crushed by a little pressure; or of hard cells forming a more or less massive enduring trunk. Such stems, though they start like the soft green ones of the herbs, develop a jacket of specially modified cells, which gradually becomes thick bark.

The leaf is normally a thin, flat, green expansion of soft cells which contain the green chlorophyll essential to the nutrition of the plant. A



Planimeter. Diagram showing Amsler's planimeter. See text

strand of vascular tissue runs from the stem down the centre of the leaf (midrib) and branches to the edges. The leaf-surface is studded with hundreds of breathing pores (stomata) through which is absorbed the carbonic acid gas of the atmosphere. The chlorophyll is able to separate the carbon contained in the carbonic acid gas, and to unite it with the oxygen and hydrogen contained in the water from the roots to form starch grains. These are afterwards converted into sugar. Leaves are more subject to modification than any part of the plant, and may become needle-like spines as in cactus and furze, or tendrils as in many climbing plants. They are modified into sepals and petals to protect the reproductive organs and form the flower. The stamens and carpels (pistils) which contain the sexual elements—the pollen and ovules—are also greatly modified leaves.

Plant Intelligence

Though plants lack the brain and nervous system possessed by the higher orders of animals, they have undoubted powers of communicating impressions from one part of the plant body to another by means of protoplasmic threads connecting cell with cell, and of responding to these impressions. They are sensitive to light and touch; the tips of the roots have the faculty of food-finding, for Darwin compared

the root-tip to a brain; and they have a good deal of power of adaptation to their environment. Many plants seem to have inherited memory of seasonal changes that will affect them, and to prepare in advance to meet altered conditions.

Plants that depend upon insects for the fertilisation of their ovules act in a way that would be classed as intelligent if performed by animals. Some, when fertilisation has been effected, notify the fact to the insects concerned by a change in the colour of the corolla, or by its wilting, or even by shedding it bodily. In some flowers, when the pollinating insect arrives, the stamens spring up suddenly and dust it with pollen in the exact spot that will come in contact with the receptive stigma of the next flower visited. Bulbs, which begin life as seedlings on the surface of the ground, afterwards dig themselves in to a depth where they will be safe from frost and drought. The frogbit, which floats on the surface of ditches, appears to have inherited knowledge of what would happen to it in winter when the water is frozen; so in autumn it forms several buds or bulbils into which it packs all its useful substance, and these drop into the mud at the bottom, from which they arise in spring and put forth leaves and flowers at the surface of the water.

Geographical Distribution

Theoretically, every kind of plant must have originated in one particular region, from which in course of time it must have spread gradually to those countries in which also it is found to-day. Distribution follows certain lines because of the continuous suitability of climate and soil. Continuity is interrupted because the suitable soil is already occupied by a more vigorous species. Seas or mountain-chains may be impassable for one species. Various agencies assist in the spread of plants from their original homes, among them being winds, rivers, ocean-currents, birds, and beasts, mostly as seed-carriers.

Sometimes plants have passed from continent to continent by formerly existing land-bridges. Many plants found in Cornwall and Ireland also occur only in W. France and the Iberian Peninsula. It has been concluded that these plants reached Ireland and Cornwall by land, at a period when Ireland was joined to England, and England to France and Portugal. See Botany; Bud; Crescograph; Flower; Leaf; Pistil; Plant, colour plate, facing page 6151; Stamen, etc.; consult also Plant-geography

upon a Physiological Basis, A. F. W. Schimper, Eng. trans. W. R. Fisher, 1903; The Romance of Plant Life, G. F. S. Elliot, 1907; Oecology of Plants, E. Warming and M. Vahl, 1909; Links with the Past in the Plant World, A. C. Seward, 1911.

Edward Step

Plantagenet. Name commonly given to the family to which the English kings from Henry II to



Richard II belonged. More correctly they are styled Angevins, from Anjou, of which Geoffrey, father of Henry II, was count. Plantagenet was a nickname bestowed on Geoffrey because he wore a sprig of broom plant (Lat. *planta genista*) in his cap, and was not used as a surname for his descendants until later, being adopted as such first, perhaps, by Richard duke of York, father of Edward IV.

After the death of Richard II, in 1399, the throne passed to the house of Lancaster, and then to that of York, both of these being branches of the Plantagenet family. In the male line the family became extinct when Edward, earl of Warwick, a nephew of Edward IV, was put to death in 1499. The name Plantagenet was borne afterwards as a surname by one or two illegitimate descendants of the kings. Through females all the sovereigns of Great Britain since Henry VIII are descended from the Plantagenets. See Angevins; Anjou; Henry II.

Plantaginaceae. Natural order of annual and perennial herbs, natives of all temperate regions. As a rule the leaves all spring directly from the rootstock. The flowers are small, green, and inconspicuous, in spikes, and the fruits are small capsules.

Plantain (*Plantago*) Genus of herbs of the natural order Plantaginaceae, natives of alltemperate regions. They have incon-



Plantain. Leaves and fruit spike of *P. major*

spicuous green flowers, fertilised by the wind as pollen carrier. The Greater Plantain (*P. major*), known also as waybread, produces long spikes of fruit, used for feeding cage-birds. In almost every place where Europeans have been this plant is found as an introduced weed, and the coloured races know it as the white-man's foot. *P. media*, lamb's tongue, or hoary plantain, is a nuisance on lawns, where its rosette of broad leaves lies so close to the ground that it kills out the grass. See Banana; Inflorescence.

Plantain Eaters (*Musophagidae*). Family of birds peculiar to the continental portion of the Ethiopian region. They consist of six genera and about 25 species. They vary in size, ranging from 15 to 30 ins. in length. They have large eyes, long necks, and the red, yellow, or black bill is usually stout and broad. The black feet are strongly clawed, and the outer toe is reversible. Most species have erectile crests on the head, and the plumage is metallic blue and green, or grey-brown, varied with crimson. The red feathers yield a pigment (turacin). Usually found in pairs or small flocks in wooded country near water, their food consists of bananas, tamarinds, papaw, and other fruits, varied by insects, worms, molluscs, and small birds. Their notes are a scream or a cat-like mew. They run swiftly, but are caught and eaten by the natives. *Turaco corythaix*, of S. Africa, is known locally as the lory.

Plantain Lily (*Funkia*). Genus of perennial herbs of the natural order Liliaceae. They are natives of Japan. The perennial organs are a bunch of tubers. The leaves, which spring direct from the crown, are large, oval or heart shaped. The flowering stems rise above the leaves and bear a number of tubular flowers of white or lilac tint, each with a narrow leaf-like bract beneath its stalk. Several species are in general cultivation as bedding or border plants.

Plantation. Term applied to a newly planted copse or wood, established either by planting nursery-raised seedling trees, or by the sowing of seed. Plantations in Britain are usually made up with mixed trees, the quicker growing conifers being employed to shelter the others from wind and weather. In the course of years, when the conifers, etc., have been cleared away and used for fuel, or commercial purposes, the slower growing trees become technically a wood. In making a plantation of conifers, it is usual to sow gorse or furze seed to act as protection against weather. The word planta-

tion is usually applied to estates devoted to the cultivation of crops which need constant renewal, as rubber, sugar, rice, tobacco, and cotton. Such were the plantations in America and the W. Indies, to which convicts and slaves were sent. By analogy the word is applied to the settlement of men and women in a new country, and so we speak of the plantation of whites. See Colonisation; Slavery.

Planthouse. Technical name applied to the whole of the glass structures used in the garden for the purpose of cultivation of plants from warm climates. It thus embraces conservatories, forcing



Plantain Lily. Flowers and leaves of the Japanese plant

houses, orchid houses, hothouses, heated greenhouses, cool greenhouses, frames, and every other form of glass-roofed erection which affords protection to plant life from the weather, with the single exception of orchard houses (*q.v.*), devoted to the cultivation of fruit only. Modern usage, however, has limited the term planthouse to the long, low, span-roof houses with brick sides and solid foundations, which are used for forcing plants for market. See Greenhouse.

Plantin, CHRISTOPHE (1514-89). French printer. Born at St. Avertin, near Tours, he settled at Antwerp in 1549, as a book binder, took up printing in 1555, and founded a business which won for him a European reputation. The most notable example of his work is the Polyglot Bible, of 1569-72. In 1570 Philip II granted him a special privilege as printer of liturgical books, in addition to which he issued some fine editions of the classics. He opened branch offices in Leiden and Paris. After his death the business was carried



Christophe Plantin, French printer

on by his son-in-law, Jean Moretus, the latter's son Balthasar, and other members of the family. See Plantin-Moretus Museum; consult also Christophe Plantin, imprimeur anversoise, M. Rooses, 2nd ed. 1896.

Planting. Art of placing trees, shrubs, and plants in a proper manner in suitable soil, to ensure their healthy establishment and welfare. In planting fairly large trees the question of aspect needs consideration. Twisting trees and even shrubs round indiscriminately to face new aspects retards their growth. Hence before being moved from its original home the side of a tree which has been facing, say, S., should be marked in order that it may be placed in the same direction in its new home. Roots should be disentangled, broken pieces and tap-roots pruned off, and the fibres spread out horizontally.

The quick method of digging a narrow, deep hole, and cramming the roots of a plant or tree into it vertically, is wrong. The soil should be pressed very firmly about the roots of newly planted trees and shrubs, especially when the operation is carried out in the autumn. Spring-planted subjects may be allowed a little more latitude in this respect, as there is less danger of frost to be feared. When planting the young greenhouse-raised summer bedding plants, the soil should be left fairly free and open for the purpose of aeration, but care should be taken to set the roots fairly deep in the ground. The soaking of water which follows the planting of summer bedding plants usually washes the soil down sufficiently close to secure the welfare of the roots of the plants in their new homes. See Afforestation; Forestry; Gardening; Sowing.

Plantin - Moretus Museum. Fine old building in Antwerp where Christophe Plantin established his home and printing-office in 1576. For nearly 300 years his descendants issued books, the last in 1865. In 1876 the building and its contents were bought by the city of Antwerp. The Plantin composing and printing rooms, foundry, and book shop have all been kept intact. The museum contains many productions of the Plantin-Moretus and other early presses, valuable books, MSS., and incunabulae, tapestries, and portraits and pictures acquired by successive generations of the family.

Plaque. In art, a flat metal plate on which enamels are painted, and, by transference, the enamels themselves, e.g. those made at Limoges (q.v.) in the 15th century. The word was also used of the plate of a clasp, the badge of an order of

knighthood, and in modern times it signifies a plate of china or earthenware on which designs are painted and burnt in. See Enamel.

Plaqueette. Rectangular variety of the medal, generally used for portraiture. The designing of plaqueettes, neglected after the Renaissance, was revived in France about 1880 by L. O. Roty and J. C. Chaplain. See Medal.

Plasencia. City of Spain, in the prov. of Caceres. It stands on the river Jerte, an affluent of the Alagón, 156 m. by rly. W. of Madrid. Its unfinished cathedral was founded in 1498. Plasencia was founded by Alphonso VIII of Castile in 1189 and created a bishopric in 1190. It has a palace dating from 1550 and remains of 12th century walls. The convent of San Yuste, where Charles V retired after his abdication, lies 24 m. to the E. Pop. 9,500.

Plassey. Former village of Bengal, India. On the Bhagirathi, about 95 m. N. of Calcutta, it was here that Clive defeated the nawab of Bengal, June 23, 1757. In 1756 the British at Calcutta were threatened by Suraj-ud-Dowlah, nawab of Bengal, Orissa, and Bihar, who captured the town, and followed this with the famous atrocity of the Black Hole (q.v.), June, 1756. Operations against him were carried on by Clive with varying success through the winter and the spring of 1757. Clive came to an arrangement with Mir Jaffir, the nawab's commander-in-chief, to set him on the throne of Bengal, and on June 13 advanced up the Hooghli from Chandernagore.

His force consisted of about 1,000 Europeans, 2,100 sepoy, and 10 guns, and, informed by Mir Jaffir of the nawab's plans, he advanced to Plassey. Crossing the river on June 22, he faced the advancing enemy on the next day. Suraj commanded some 35,000 foot soldiers, with 18,000 cavalry, and about 50 guns, including some French batteries. After a violent bombardment which strained the nawab's ammunition resources, Clive attacked, and overpowering a stubborn French redoubt, swept the field. Mir Jaffir was installed as nawab, but as he was merely a nominal ruler, Plassey had made the British masters of Bengal at insignificant cost. The river had eaten away the actual field of battle by 1801. See Clive; India: History.

Plaster. Pasty composition, used for coating walls, ceilings, etc. From remote times it has been a common practice to give a more or less smooth finish to wall surfaces by covering them with a tractable

material—plaster, a term that may be held to include the clay-daubing of primitive huts. With respect to materials, choice is limited to earths containing cement, crude or manufactured, and used separately or in combination with other materials, such as powdered stone or marble, asbestos, tufa, sand, hair, fibre; a modern development being the introduction of jute, or similar material, to bind and strengthen the plaster; while the addition of agglutinates like molasses or glue facilitates moulding and modelling to decorative shapes. Fibrous plaster has also been extensively used as a constructive material for certain kinds of buildings.

Varieties of Plaster

Ordinary plaster, as used on walls and ceilings, is made by mixing in water slaked lime with twice its bulk of clean, sharp sand—river sand for external and pit sand for interior work. Plaster of Paris is used by the plasterer mainly for patching and repairing, but is also mixed with ordinary plaster to quicken setting and to give greater hardness. The cements known as Keene's, Martin's, and Parian all have gypsum as their basis, and in the order given are compounded respectively with alum, carbonate of potash, and borax. Roman cement is made from the nodules or septaria found in the London clay.

Stucco for external work usually consists of one part Portland cement to four parts sand for the first coat, with less sand for the finishing coat, but sometimes Roman cement is preferred for its warmer colour. As used extensively by Nash the architect, who made it fashionable, stucco was one part of hydraulic lime to three parts of sand.

Laths used in plastering are generally of Baltic fir. They are nailed to upright posts (studs), sufficient space being left between the laths to admit the plaster to a strong foothold. In fire-resisting construction, wooden laths are discarded for some form of stamped-metal or wire-mesh fabric to receive the plaster or cement. Alternatively, internal partitions, instead of being formed of lath-and-plaster, are constructed of sheets of fibrous plaster, or of patent partition blocks left with a rough surface to serve as a "key."

In the plain plastering of interiors the familiar creamy mixture of lime, sand, and hair or fibre, and water, is applied to lathed walls and ceilings, is technically described as render, float, and set, or three-coat work. The rendering, or first coat, consists of

coarse stuff—one part fat lime to two or three parts sand, with a pound of ox-hair to two cubic feet of plaster. This coat is left with a rough surface, on which intersecting furrows are scratched with a lath, to form a key for the next coat (floating), which contains less sand and less hair than the rendering coat, and is floated to an even surface by means of straight edges or of a Derby float—a large flat board with two handles at its back. To get a true surface, a general level is indicated by placing fillets of plaster (screeds) at intervals over the surface, the plasterer bringing the intervening spaces to the level fixed by the screeds. A smaller float is then worked over the surface, which finally is scratched with a coarse broom of bristle or fibre to give a hold to the setting coat, which may consist of fine lime plaster to which plaster of Paris has been added, or, if a specially hard and smooth finish is desired, one of the numerous patent plasters may be used.

Decorative plastering—the panning, covering, gilding, colouring, and general enrichment of walls and ceilings—had become very elaborate in Tudor and Jacobean times, and in the late 18th century Adam, Chambers, Nash, and other architects designed rich effects in plaster. Ornamental plastering may involve the use of the casting-box and the chisel; but the legitimacy of cutting plaster is disputed, on the ground that sharpness of edge and outline is alien to the essentially “fat and sleepy” character of plaster. Wood or zinc moulds are used in running cornices, and other straightforward ornaments; but rosettes, festoons, cables, and other irregular patterns must be cast from modelled designs, from which moulds are made in gelatine, plaster, or wax.

The form called *aggraffito* decoration is obtained by placing a transfer design on the second of two finishing coats, the first coat dark, the other light, and scraping away portions of the top coat to form a pattern in slight relief. Pargeting or parge work shows a raised pattern. Rough-cast is work in which the finishing coat is mixed with gravel or coarse sand. In pebble-dash small stones are thrown against the final coat before it sets. Plaster casts are often made to imitate metal by coating with an electro-copper deposit. See Cement; Mural Decoration; consult also Notes on Building Construction, Part II, chap. ix, Rivington & Co., 1875; Plastering, Plain and Decorative, W. Millar, 1897; The Art of the Plasterer, G. P. Bankart, 1908.

Plaster of Paris. Partly dehydrated calcium sulphate formed by heating to 120° to 130° C. the mineral gypsum, which then loses three-fourths of its water of crystallisation. On the addition of water equivalent to that removed by calcining, plaster of Paris recrystallises, and sets as gypsum. It is sometimes added to ordinary lime plaster to quicken the setting, or by itself for forming delicate mouldings and ornaments, or for repairing plaster walls of ceilings. It sets very quickly. Heated to 194° and finely ground, gypsum forms a hard flooring material and is a component of many proprietary flooring compositions. Its name is derived from the extensive deposits found near Paris.

Plataea. Ancient city of Greece, in Boeotia, on the N. slope of Mt. Cithaeron. Leaving the Theban league, Plataea became an ally of Athens, and sent 1,000 men to the battle of Marathon. In the second Persian War, Xerxes destroyed the city at the instigation of Thebes, 480 B.C. The Persian army under Mardonius, with a Theban contingent, fought the allied Greeks under Pausanias of Sparta before Plataea in 479.

Pausanias was forced to withdraw in some confusion, but rallied his army, and the heavy armed Greeks drove the Persians back to their camp, which was stormed with the aid of the Athenians, the Persian army being almost annihilated. This victory, following upon that of Salamis, decided the struggle.

The independence of Plataea was then guaranteed by the Greek states, but in the Peloponnesian War (*q.v.*) it was besieged, 429–427, and destroyed by Thebes and Sparta. In 372 the Thebans again destroyed it. See Greece.

Plate (late Lat. *platta*, a thin sheet of metal; *cf.* Gr. *platys*, flat). Word used in various derivative senses, all suggesting something thin and flat. In household use, plates or platters were commonly made of wood or pewter until earthenware came into general use. In engineering, iron or steel plates are used in the construction of boilers and the hulls of ships.

In farriery the shoe put on a racehorse is called a plate, and the same word is also used for any prize given in horse-racing without any stakes provided by the owners of the horses engaged.

In photography, a plate is the flat support, usually of glass coated on one side with sensitive emulsion. When exposed to light, and developed, it becomes a negative. Ferrotypes plates are used to

secure collodion positives. In engraving, a plate is the metallic surface on which the engraving is done, and, by transference, the impression from the engraved plate. Plate is a general term for gold or silver articles, while the word is also used in mineralogy and anatomy, and in heraldry, where it means a roundel argent. See Electroplating; Photography; Sheffield Plate.

Plate. Name sometimes given to the S. American estuary better known as the Rio de la Plata, or River Plate. See La Plata.

Plateau. In physical geography, a broad, flat, elevated region, or raised plain. Plateaux or tablelands may be classified as follows: (1) Those built of accumulated materials; (2) those produced by the elevation of a former plain; (3) highland areas which have been denuded to plateaux. Examples of the first type are found in the W. Cordillera of N. America, and in similar highland regions.

The high plains, the famous ranching lands, stretching from Alberta to Texas, situated E. of the Rocky Mts., are plateaux caused by the uplift of the Rockies raising the adjacent plains. They, like similar regions E. of the Andes, in S. America, and the Allegheny Plateau W. of the Appalachian Mts., are examples of the second type. To the third class, *i.e.* plateaux which are worn-down highlands, belong the Laurentian Plateau of Canada, the Piedmont Plateau E. of the Appalachian Mts., the plateaux associated with the ancient Highlands of Australia and the Highlands of Scotland. The most extensive plateau in the world is the continent of Africa, for the whole of that land mass, with the exception of the extreme N.W. and S.W., is of this type of relief. Owing to their elevation, plateaux have a cooler climate than neighbouring lowlands, but they are frequently arid.

Platelayer. Term used for a man who lays and maintains the permanent way of a railway. Such men are so called from the type of rail first used, which was known as the plate rail.

Platen (French, *platine*). In printing, flat metal part of a press that, by pressing the paper against the type, makes the impression. A platen machine is one that has a flat as distinct from a cylindrical method of impression. See Printing.

Platen-Hallermund. COUNT AUGUST VON (1796–1835). German poet. He was born at Anspach, Oct. 24, 1796, and entered Würzburg University in 1818, moving to Erlangen in 1819. After 1826 he lived chiefly in Italy, and he died at

Syracuse, Dec. 5, 1835. In his Ghaselen, 1821 and 1823, Gedichte (Poems), 1833, and Polenlieder



Count von Platen-Hallermund, German poet

(Polish Songs), 1831, he wrote a number of Oriental and other poems that contain his best work. As a dramatist he enjoyed much success, notably in the comedies *Die Verhängnisvolle Gabel* (The Fatal Fork), 1826; and *Der Romantische Oedipus* (The Romantic Oedipus), 1828, a comedy in which he attacked the exponents of the Romantic movement so strongly as to be himself bitterly attacked by Heine and other writers. Another notable play was *Die Liga von Cambrai* (The League of Cambrai), 1833. His collected works were published in 1839.

Plate Powder. Powder for cleaning silverwork. Powdered chalk and jeweller's rouge in the proportions of three of the former to one of the latter, with enough water to make a paste, forms a plate powder. It is applied wet with a rag, and polished off when dry with a soft cloth or brush.

Plates. In metallurgy, sheets of metal above 3-16ths of an inch thick. They are made in lengths up to 40 ft., in width up to 12 ft. Ordinary thicknesses run up to 1½ in., armour-plates to 18 ins. Plates are made by rolling out an ingot or a billet while in a highly heated condition. See Iron; Steel.

Platform. Raised level surface, something erected above the ordinary level. Such are used by public speakers, hence a political programme is sometimes called a platform. The word is used for the levels where, at railway stations, passengers enter and leave the trains. In large stations these are numbered. See Railways.

Platinum. One of the rare metallic elements. Its chemical symbol is Pt; atomic weight, 195; specific gravity, 21.5; melting point, 1,775° C. (3,227° Fah.); colour, tin white or steel grey with metallic lustre. The metal is very ductile, and next to gold and silver the most malleable substance known. It is only exceeded in infusibility by two or three of the still rarer metals; it is not affected by nitric, hydrochloric, or sulphuric acids in the cold, but is soluble in hot aqua regia. It resists oxidation at any temperature, but is attacked by heated sulphur, phosphorus, arsenic, se-

lenium, iodine, and a number of phosphoric compounds. Harder than copper, in the molten state it absorbs quantities of oxygen.

It was first recognized in the alluvial gold deposits of Choco and Barbacoas, in Colombia, where it was given the name *platina* from its similarity to *plata*, silver. It has since been found in the Ural Mts., in Borneo, the Rhine sands, St. Domingo, Tasmania, New South Wales, N. Carolina, U.S.A., Burma, Japan, Spain, Canada, and Brazil. Platinum is mostly found associated or combined with minute proportions of palladium, rhodium, iridium, and osmium, or one or more of those metals. Before the Great War the chief sources of the metal were the alluvial deposits in the Urals, where it has been for years obtained by dredging. In 1917 the total world's production of platinum was only 89,932 oz.

In obtaining the pure metal the ore is concentrated by washing and the gold removed by amalgamation as far as may be, after which the mineral is digested in weak aqua regia to dissolve any remaining gold, then in strong aqua regia under pressure, when the metal with iridium and rhodium enter into solution as chlorides. After filtration, evaporation, and digestion with water, treatment with ammonium chloride, further digestion with alcohol, drying and heating, the metal is obtained in the form of a spongy mass, which is compressed at a high temperature to a metallic form in which it may be utilised in the manufacture of vessels.

Platinum black is an extremely finely divided form of the metal and has a remarkable power of occluding hydrogen and oxygen, as has spongy platinum. The metal is used in the manufacture of strong sulphuric acid; in the construction of electric lamp bulbs; in the preparation of standard weights and measures, crucibles, pyrometers, and other implements for chemical laboratories; in dentistry for the preparation of plates and anchors; in photography, as potassium chloroplatinite, in the platinotype process; and for jewelry, for which latter purpose it is generally alloyed with 25 p.c. of iridium, which increases its strength and hardness. See Metal; consult also *The Precious Metals*: Gold, Silver, Platinum, T. Kirke Rose, 1909; *A Handbook of Metallurgy*, C. Schnobel and H. Louis, 3rd ed. 1921.

Platinum Printing. Process of making permanent photographs or platinotypes. Paper is rendered sensitive to light by application of an iron salt, ferric oxalate, with which is mixed one of platinum, potassium chloroplatinite. On exposure to light under a negative a semi-visible image is produced. It is brought to full depth in a solution of oxalate of potash, and is then passed through several weak acid baths to remove the iron salts. After a short washing in water, the print is ready to be dried. Platinum paper is prepared to give either black or sepia prints, which have the natural surface of the paper, since there is no gelatin coating as in emulsion papers. See Photography.

PLATO AND PLATONISM

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Related articles are those on Aristotle; Socrates; and other great philosophers. See Academy; Idea; Neo-Platonism; Philosophy; Sophists; also Greece; Greek Literature

Born at Athens, or in the island of Aegina, of distinguished family, Plato spent most of his life in the city of Athens, immersed in the study and the teaching of philosophy. He is said to have visited Egypt, Magna Graecia, and Sicily, and to have been captured and sold as a slave at Aegina, but the trial and execution of his master Socrates, 399 B.C., was by far the most moving incident in his career. Henceforth there was only one career for him, to carry on the mission of his martyred teacher. The record of that mission is set forth in the rich collection of Dialogues that have come down to us. Of the 35 treatises—many critics reject the Letters—ascribed to Plato, some 24 are probably

from his hand. Through these works his influence has been perpetuated to the present day.

In the make-up of Plato are discerned three strains seldom found so conspicuously united in a single mind. The acuteness and subtlety of the logician, the imagination of a seer and poet, and the enthusiasm of a shrewd but austere moralist are his in the highest degree. Typical of the first is the Theaetetus, with its keen analysis of logical scepticism as taught by Heraclitus and Protagoras; the second strain is dominant in the Phaedo and Phaedrus; the third in the Laws; while the Republic exhibits in perfection the blending of all three.

Plato, or Aristocles, as he was

originally named, was born two years after the death of Pericles, and the world in which he grew up was one possessed by a desire to correct and restore the distracted social and political system of Hellas. That system culminated in the city state of Athens, a thoroughgoing democracy. Plato set himself to understand Hellenic society in all its extent and depth, with the practical object of pointing out weaknesses and indicating reforms. In so doing he struck out a system of philosophy based on contemporary experience, designed to set forth the principles of life and conduct exhibited therein. The note of his conclusions everywhere is idealistic, and the whole question of the interpretation of Platonism depends on an understanding of these "ideas."

Theory of Knowledge

In discussing logical and metaphysical problems, Plato took over certain results attained by his predecessors, including Socrates. His primary task here was the refutation of various logical heresies advocated by famous philosophers or sophists, these comprising the leading educators of the period, in which sense Socrates himself was a sophist. To take an example: There was a treatise by Gorgias, written to maintain the disconcerting thesis—nothing is; if anything is, it cannot be known; if anything is and can be known, it cannot be expressed in words. As against this nihilistic doctrine, Plato built up a theory of knowledge that would account for the fact that men know and reason and act intelligently in a world not wholly incomprehensible.

Plato's argument starts from certain assumptions, of which three are often combined to form the outline of a logical theory, more or less consistent. First, it is plausible to hold that the world of things is composed of particular objects, all existing independently, despite mutual action and re-action; secondly, within the world of knowledge we are aware of a collection of thoughts each different from all the rest; again, particulars in the external world, objects in space, appear to have an existence of their own, separate and independent of thoughts about them. Plato, in his long series of dialogues, forces to the front the truer view; first, that the multitude of objects in space, while each is separate and individual, yet possess each a character which is shared by other objects; secondly, that the simplest thoughts, although they occur as particulars, are likewise each recognizable as

more or less the same as other thoughts; thirdly, that things in space not merely correspond to thoughts in the mind, but that they are capable of being known.

Particular things and particular thoughts are, he holds, what they are because, somehow, they embody a universal nature or form. As to particular objects in space, we are easily led to allow that there are such "universals," which enable us to recognize instance after instance of the same object in the external world. Further, we admit readily that thoughts in the mind may exhibit a sameness which in this region too compels us to con-



Plato, Athenian philosopher

cede these universals. But, when we are asked to admit that there is a common ground or character as between objects in space and thoughts in the mind, we are far from unanimous. The vast majority of philosophers part from Plato here, and diverge into the numerous forms of nominalism, sensationalism, and materialism which deny the ultimate identity of thought and things.

Particulars and Universals

The effort to expound the true relation of universals to particulars absorbs a great deal of Plato's energy. It speedily led him to lay stress on thought as the active principle in the world which we know. Ideas, he argues, are in the last analysis the substance of the world which we experience, and much of his language lends itself to the popular picture of this system as one which confused ideas with solid realities, and maintained that ideas were real and things unreal. This picture of Platonism ignores his strenuous search into the true relations between particulars and universals, facts and ideas. It cannot be said that Plato quite satisfied himself

as to his exposition of that relationship. He tried "imitation," "communion," "participation," as explanations, and found none of them adequate. His conclusion, however, is not far removed from that summed up in a modern formula like "identity in difference." Plato's dictum "what is wholly real is wholly knowable, and what is utterly non-existent is completely unknowable," answers to the modern assertion of "the unity of the intelligible world with itself and the mind that knows it."

His Idea of the Good

In the region of ethics and politics, Plato was the first thinker to offer a satisfying account of the principles that form and govern conduct and character. Socrates had dealt with the fluid and confused conceptions about right and wrong, vice and virtue, by persistent questioning of all who were thrown in his way. By exposing the contradictions involved in popular opinions about these matters, Socrates gradually moved towards a solution of his own perplexities; and the most remarkable of his conclusions is the familiar "virtue is knowledge." The intellectual aspect of morality implied by this definition, indeed, is frequently arraigned as a prejudice infecting Greek ethics in general. It is too much a matter of the head, too little of the heart; and the stress in that respect is differently placed in Christian ethic. But in Plato morality is far from being intellectual in the sense of abstract at any rate. Plato's "justice" is the virtue of the good citizen, and his idea of the good is to be realized in the life of the commonwealth. In the Republic it is from the larger life of the justly organized state or society that he reads off the features of the good life of the individual. Here is the embodiment, the actuality, even if imperfectly attained, or the idea of the good, which for Plato solves the riddle of the universe. In this idea of the good, which corresponds to the Christian God, he finds not merely the end of life, but the ground and cause of all existence.

The influence of Plato is to be estimated by the numberless thinkers and poets who have drawn inspiration from him. Plato was succeeded by disciples who undertook to carry on his teaching; but his true successor was Aristotle, who developed Platonism on more scientific lines.

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Platoon (Fr. *peloton*, group of people). In the British army, a subdivision of an infantry company. The platoon was a tactical unit in the 17th century, but was superseded in the 19th by the small company and half company. It was, however, revived in 1914, and each battalion is now divided into sixteen platoons, four platoons forming a company. Each platoon is under the command of a subaltern, and has a strength of about 60 men. See Battalion; Company; Sergeant.

Platte (Fr., low, shallow). River of Nebraska, U.S.A. It is formed by the union of the N. and S. Platte rivers. The N. Platte rises among the mountains of N. Colorado, and flows 650 m. N. and S.E. through Wyoming and Nebraska. The S. Platte has its source in the centre of Colorado, and flows 500 m. E. by N. The main channel follows a S.E. course through the Nebraska plains and joins the Missouri about 10 m. below Omaha. The main river measures about 215 m.

Platten See. German name for the Hungarian lake Balaton (*q.v.*).

Plattner, KARL FRIEDRICH (1800-58). German metallurgist. Born at Kleinwaltersdorf, Saxony, Jan. 2, 1800, he became inspector of the royal mines in Saxony, and while holding the post invented the method of blow-pipe analysis for metals with which his name is associated. He died at Freiberg, Jan. 22, 1858. See his Manual of Qualitative and Quantitative Analysis with Blow-pipe, 8th ed. 1902.

Plattner's Process. Method of extracting gold from its ores. It consists essentially in dissolving out gold from an ore by means of gaseous chloride, which combines with it and converts it into chloride of gold, which in turn is dissolved in water and precipitated by various agents. See Gold.

Plattsburg. City of New York, U.S.A., the co. seat of Clinton co. It stands at the mouth of Saranac river, on Lake Champlain, 165 m. by rly. N.N.E. of Albany, and is served by the Delaware and Hudson Rly. Plattsburg was settled in 1784, incorporated in 1785, and became a city in 1902. In the bay the British fleet was defeated, Sept. 11, 1814. Pop. 10,900.

Platyhelminia (Gr. *platys*, broad, flat; *helmins*, worm). Lowest group or phylum of worms, in which the soft body is more or less flattened, not distinctly segmented. It is divided into three orders: Turbellaria, including planarians (*q.v.*); Trematoda or liver-flukes; and Cestoda or tape-worms. See Worm.

Platypus (Gr. *platys*, broad; *pous*, foot). Name sometimes used for the duckbill (*Ornithorhynchus anatinus*), an extraordinary Australian animal intermediate between the mammals and reptiles. They have the muzzle shaped like a flattened beak; the four limbs have webbed feet. The females lay eggs. See Duckbill; Ornithorhynchus.

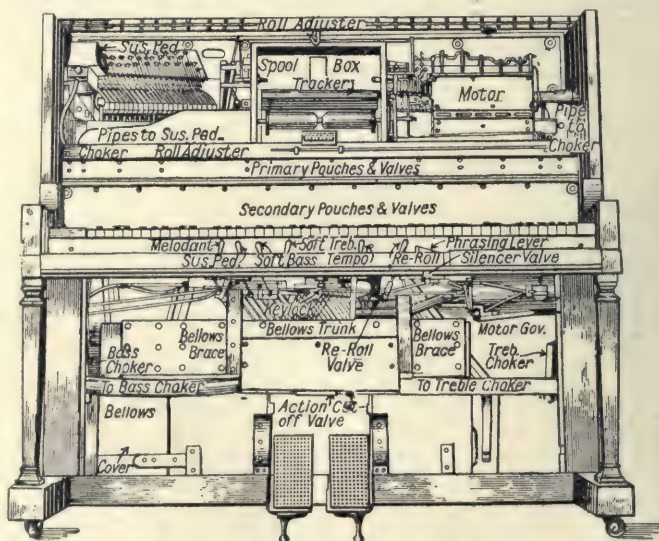
Plauen. Town of Saxony, Germany. It stands on a plateau on the right bank of the White Elster, 60 m. from Leipzig, and is a rly. junction. The chief buildings are the old castle, now used for public purposes, the town hall, and S. John's Church, a fine Gothic edifice. The principal industries are the manufacture of lace, embroideries, and textiles. Pop. 121,000.

Plautus, TITUS MACCIVS (c. 251-184 B.C.). Roman writer of comedies. Born at Sarsina in Umbria, he came to Rome when young and obtained some employment on the stage. Having lost his savings in unsuccessful speculation, he was reduced to earning his living in a flour-mill, writing comedies in his spare time, which proved so successful that he devoted the rest of his life to play-writing. Of the 130 comedies with which he was credited in antiquity only 21 have been preserved; they are adaptations from Demophilus,

Diphilus, Menander, and Philemon. The pungent wit, although at times coarse, the rapidity of the action, the shrewd knowledge of human nature displayed, have made the comedies of Plautus popular down to modern times. The best text is that of J. L. Ussing, 1875-86, with Latin notes, and most of the plays have been separately edited. There are complete English translations by Bonnell Thornton, 1767-74, and by H. T. Riley, 1880, in prose. See Amphitryon; Comedy of Errors; Ralph Roister Doister.

Player Piano. Strictly speaking, a piano fitted with a player, sometimes called a piano player. This contrivance differs from a mechanical piano, which by means of a barrel reproduces only set tunes, for by the player any music can be rendered, provided it has been transcribed on the necessary rolls. There are numerous makes, but the main principles are the same in all. The "notation," or music, consists of perforated paper which passes over a tracker-bar in which are 88 holes, each corresponding to a particular note. The bellows act on the suction principle, the notes of the piano being actuated by the air which is drawn in when the holes in the perforated roll coincide with those in the tracker-bar. By means of levers, the speed and the soft and the sustaining pedals can be controlled, and expression and special melodic effects secured.

The latest development is to switch on certain mechanism whereby rolls can be manipulated, reproducing with the utmost fidelity the individual performances of great artists. The piano is thus available



Player Piano. Diagram showing mechanism of an Angelus player piano

By courtesy of Sir Herbert Marshall & Sons, Ltd.

in three distinct ways: (a) as an ordinary instrument; (b) as a mechanical player giving the performer's own interpretation; and (c) as a reproducer of the performances of celebrated pianists.

Playfair, LYON PLAYFAIR, 1ST BARON (1818-98). British chemist and politician. Born at Chunar,



Bengal, May 21, 1818, and educated at St. Andrews and Glasgow Universities and at Giessen, he became in 1842 professor of chemistry at the Royal Institution, Manchester.

He was appointed chemist to the Geological Survey, 1845, and professor at the School of Mines. He carried out at this time a series of important investigations into nitro-prussides, coals for steam navigation, the gases of the blast furnace, etc. Professor of chemistry at Edinburgh in 1858, in 1868 he was elected M.P. for Edinburgh and St. Andrews Universities. He was M.P. for South Leeds in 1885 and died May 29, 1898. Made a peer in 1892, Playfair received many honours from foreign universities and took part in many royal commissions, notably those on the health of towns, potato disease, and cattle plague. See *Memoirs and Correspondence*, Sir T. W. Reid, 1899.

Playgoers' Club. London club founded in 1884 for social intercourse among frequenters of the theatre and for discussion of new plays and of theatrical questions generally. Lectures, concerts, and dinners are given from time to time under the auspices of the club. Its premises are 20, Cranbourn Street, London, W.C.

Playhouse, THE. London theatre. It is in Northumberland Avenue, W.C. The Avenue Theatre (*q.v.*), occupying the same site, was partially destroyed in 1905 and rebuilt as The Playhouse. The new building was opened in Jan., 1907, by Cyril Maude with Toddles.

Playhouse Yard. Turning out of Water Lane, Blackfriars, London, E.C. Here is the office of *The Times* (*q.v.*). The name commemorates the Blackfriars Theatre, which stood here from 1597-1655. Another Playhouse Yard, linking Upper Whitecross Street and Golden Lane, E.C., derives its name from the Fortune Theatre in Golden Lane, built 1601, for Alleyn and Henslowe, burnt, 1621, rebuilt, and demolished about 1660. See *Blackfriars*; *Shakespeare*.

Playing-Card Makers, THE. London city livery company. It was granted a charter Oct. 22, 1628. The office is at 28, Basinghall Street, E.C. See *Cards*, *Playing*.



Playing-card Makers' arms

Plea (late Lat. *placitum*, decree, decision). Formerly, a document in which the defendant in an action answered the plaintiff's declaration or statement of claim. A plea might be to the merits, or it might be in bar, or it might be a dilatory plea. The science of pleading was highly technical, and there was a race of great lawyers who did little else but draw these documents. The plea is now abolished, except in the mayor's court, London.

Pleas of the crown is the English legal term for all criminal suits or causes in which the sovereign appears as the plaintiff.

Pleadings. In English law, the documents in which the plaintiff and defendant respectively state their cases. When, therefore, the case comes into court, the parties and the judge know what is the issue to be tried. Under the present system the plaintiff must first set out the facts on which he relies in a statement of claim. The defendant answers in a defence, in which he either admits or denies each or any of the plaintiff's allegations, and sets out also any affirmative facts on which he relies for a defence.

Pleasley. Village of Derbyshire, England. It stands on the river Meden, 3 m. from Mansfield, with stations on the Mid. and G.N. Rlys. The church is dedicated to St. Michael, and there is an old market cross. At Pleasley Vale are large factories for making silk and cotton material, and around are coal mines. Pop. 8,400.

Pleasure (Lat. *placere*, to please, through Fr. *plaisir*). An agreeable physical or mental state, the opposite of pain, but independent of it. Its causes are two: activity, whether bodily or mental, movement or thought, when it is easily exercised and intensified, and desire for the realization of an object. The immediate effect of pleasure is an effort, directed towards retaining it as long as possible, or recovering it at some future time. It also acts as a signal of realization, a token that the desired object has been attained, and as a stimulant. Ethically, pleasure is only a means, not an end in itself. See *Hedonism*.

Plebeian. Name given to the common people (*plebs*) of ancient Rome, as opposed to the ruling

order of patricians. They were originally the subject peoples, resident aliens, and even fugitive slaves; but as time went on and many of them attained to wealth and influence, they demanded some share of the political power which the patricians kept in their own hands. The struggle lasted more than 200 years. In 494 B.C. the plebeians gained the right of electing special magistrates of their own, called tribunes; in 451 the Decemvirate was created to codify the laws and equalise them as between the two orders. The republican magistracies were successively thrown open to them, ending in 300 with the last of the priestly offices. See *Patrician*; *Rome*; *Tribune*.

Plebiscite (Lat. *plebs*, people; *scitum*, decree). Term originally applied to a law passed by the Roman people assembled in the *comitia tributa*, i.e. by tribes. Such laws, originally binding only on the plebeians, or commons, were subsequently extended to the whole of the body politic. In modern Europe a plebiscite is a popular vote on a clearly defined political issue involving the answer yes or no. A notable instance was the election of Louis Napoleon as prince-president of France in Dec., 1848, by a majority of more than 4,000,000 votes, and again three years later after the *coup d'état*; while a similar appeal to the people confirmed the restoration of the empire, Nov., 1852. By the terms of the treaty of Versailles certain frontier districts of Germany were subject to a plebiscite or popular vote to decide to which state they should belong. Of these the most important was Upper Silesia. See *Referendum*; *Silesia*; consult also a *Monograph on Plebiscites*, S. Wambaugh, 1921.

Pléiade, THE. Group of seven 16th century French poets, Pierre de Ronsard, Joachim du Bellay, Daurat, Baif, Remi Belleau, Jodelle, and Pontus de Tyard. They occupy an important position in literature from their determination to treat of great subjects. See *Ronsard* and *La Pléiade*, G. Wyndham, 1906; *A Literary History of France*, E. Faguet, 1907.

Pleiades. In Greek mythology, the seven daughters of Atlas and Pleione, and companions of Artemis. When pursued by Orion they prayed to be turned into doves. Their prayer was granted, and they were placed among the stars.

Pleiades. In astronomy, a group of conspicuous stars marking the shoulder of the constellation of Taurus. To the eye six stars only are usually visible, but in the

telescope over 2,000 can be seen. Originally seven stars were conspicuous, and were named after the seven daughters of Atlas and Pleione. Most of the brighter stars are of the helium type, and the group is nebulous in character, showing that it is probably emerging from the state of a nebula.

Plein Air. Term in art identified with a painter or school aiming at the realistic rendering of objects in full daylight. Plein air painting is usually held to have originated with Édouard Manet. See Painting.

Pleistocene (Gr. *pleistos*, most; *kainos*, new). In geology, name given to the period of time between the end of the Tertiary and the beginning of history. The period is also known as Post-Tertiary, Glacial, and Ice Age, the two latter from the fact that it was a period of great cold and glacial formation. See Glacial Period; Horse; Ice Age; Megatherium; Tertiary.

Plender, SIR WILLIAM (b. 1861). British financial expert. Born Aug. 20, 1861, he became a chartered accountant and head of the firm of Deloitte, Plender, Griffiths & Co. His experience in financial administration led to his acting as adviser to the government and to appointments to royal commissions on several occasions. He advised on questions concerning the Port of London, 1908, and in 1911 was on the committee on Irish finance. Knighted in 1911, he was made G.B.E., 1918.

Plenipotentiary (Lat. *plenus*, full; *potentia*, power). Diplomatic representative. He is accredited direct to the sovereign or head of the state. His full title is envoy extraordinary and minister plenipotentiary. See Ambassador; Diplomacy; Envoy.

Plenty, BAY OF. Wide opening of the N.E. of North Island, New Zealand. There are no harbours of any importance. Motiti, Mayor, and White are the chief islands. Numerous Maori settlements occur between the bay and Rotorua.

Pleonaste. In geology, name given to a mineral of the spinel group. In pleonaste the usual magnesium is partly replaced by iron. It is a black opaque mineral found in gneiss and the ejecta of some volcanoes. From its occurrence in Ceylon it is sometimes called ceylonite or ceylanite.

Pleroma (Gr., fullness). Term meaning that which is filled or that which makes up the fullness. Of frequent occurrence in the N.T., it is used of God or Christ (John i, 16; Col. i, 19; ii, 9; Eph. i, 23; iii, 19; iv, 13). It implies the fullness of the Divine attributes which

dwelt in Christ and that of the virtues displayed by Him, both of which are imparted to true believers, as suggested in the parable of the vine and its branches, and should therefore animate the ideal Church. See Kenosis; consult also Commentary on Colossians, J. B. Lightfoot, 1875.

Plesiosaurus (Gr. *plēsios*, near; *sauros*, lizard). Extinct marine



Plesiosaurus. Fossil skeleton of the extinct marine reptile
Victoria and Albert Museum, S. Kensington

reptile found as fossil remains in Liassic rocks. Members of the order Sauropterygia, they had thick lizard-like bodies, long flexible necks with small heads, strong tails as long as the body, and powerful paddles for swimming. The length of the animal varied from 10 to over 40 ft., according to the family to which it belonged, and the jaws of the relatively small head were armed with powerful teeth, those of pliosaurus measuring 1 ft. in length. They must have been very common in the seas of the Lias. See Dinosaur; Lizard.

Plesivec. Town in the Slovakia division of the Czechoslovak republic, also known as Pelsöcz (*q.v.*).

Pleura. Serous membrane which lines the cavity containing the lung, and on the root of the lung is reflected back to cover the lung (*q.v.*).

Pleurisy. Inflammation of the pleura or serous membrane of the lung. Two forms are recognized—dry pleurisy and pleurisy with effusion. Dry or fibrinous pleurisy may follow exposure to cold, or may occur in the course of pneumonia and other diseases of the lung. The symptoms are pain and a dry cough. On auscultation with the stethoscope, friction sounds are heard between the two roughened surfaces of the pleura. Adhesions may form between these surfaces and seriously interfere with the normal movements of the lung.

Pleurisy with effusion is much the commoner condition. The disease most often follows ex-

posure to cold or a wetting. The onset is usually abrupt, with severe pain in the side and rise of temperature, but in children and elderly persons is more likely to be insidious. The breathing becomes difficult, and this symptom is very marked, particularly in cases where there has been a rapid effusion of fluid into the pleural cavity. The percussion note, i.e.

the sound made by tapping with one hand the finger of the other hand placed over the chest, is dull, and the voice and breath sounds are altered when listened to through the stethoscope. In mild cases the symptoms subside after a week or ten days.

Pleurodynia. Painful affection of the intercostal muscles on one

side of the body. Due to inflammation of the fibrous tissue or fascia surrounding the muscles, it may be brought on by exposure to cold or wet. Treatment consists in resting the muscles by strapping the chest so as to restrict the breathing movements.

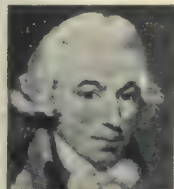
Plevna or **PLEVEN.** Town of Bulgaria. It stands about 90 m. N.E. of Sofia, on the Sofia-Varna rly., and has a branch line to Nikopolis, on the Danube. It is famous as the scene of great battles and of the siege in the Russo-Turkish War, 1877-78. Normally it has a large trade in cattle, and the country around produces good wine. Pop. 23,000.

Plevna, SIEGE OF. Incident in the Russo-Turkish War of 1877. After its occupation by Osman Pasha with an army of some 10,000 men, the Russians advanced against Plevna in the middle of July and invested the town.

After a brief bombardment, the Russians launched an attack, which was repulsed by the Turks with heavy losses, July 20. Five weeks later a second attempt by the Russians was defeated, both sides losing heavily. After this defeat extensive preparations were made by the Russians, who collected 100,000 men and over 400 guns. Osman's troops numbered 30,000, and, after a successful preliminary attack, August 30, gave battle, Sept. 6-7, despite a furious Russian bombardment, succeeding in repulsing the Russians, who had called in Rumanians to their aid. But the investment of Plevna was

tightened, and by Dec. 9 Osman found himself starved into submission, having withstood the enemy's attacks with the utmost gallantry for over four months.

Pleyel, IGNAZ JOSEF (1757-1831). Austrian composer. Born at Ruppersthal, Austria, June 1,



Ignaz Josef Pleyel,
Austrian composer

1757, he became a pupil of Haydn. After having served as choirmaster at Strasbourg Cathedral, he conducted concerts in London and then settled in

Paris, where he founded a piano business, which still flourishes, and where he died, Nov. 14, 1831. Pleyel composed much—symphonies, quartets, and an opera—but most of his work is now forgotten. His son Camille (1788-1855), also a composer, married the famous pianist Marie Moke (1811-75).

Plimer, ANDREW (1763-1837). British miniature painter. Born at Bridgwater, Somerset, he settled in London, and exhibited constantly at the Academy from 1786. His most notable miniatures were those of the R u s h o u t family, especially the group of the Three Graces, representing the daughters of Lady Northwick. He died Jan. 29, 1837. His elder brother, Nathaniel (1751-1822), also made some reputation as a miniaturist.



Andrew Plimer,
British miniature
painter

Plimsoll, SAMUEL (1824-93). British politician. Born in Bristol, Feb. 10, 1824, and educated at Penrith and Sheffield, he became a clerk in Sheffield, and in 1851 was honorary secretary for the Great Exhibition. In 1853 he settled in London as a coal merchant and made attempts to enter Parliament. He had already given much attention to the loss of life at sea caused by unseaworthy ships being sent out, and his entry into the House of Commons as Radical M.P. for Derby, in 1868, gave him opportunity to draw at-



Samuel Plimsoll,
British politician

tention to the subject. He introduced bills and wrote *Our Seamen*, 1872, the first result being the appointment of a royal commission, and the second the important Merchant Shipping Act of 1876. He resigned his seat in 1880, and spent the rest of his life in attempts to improve the condition of seamen, both in Great Britain and abroad, writing and travelling in their interests. He died at Folkestone, June 3, 1898.



Plevna. Surrender of the Turkish commander to the Russians. From the painting by V. Verestchagin

Plimsoll Mark. Circle with a horizontal line drawn through it carried on both sides of all British-owned merchant vessels. It indicates the maximum depth to which they may be loaded, and takes its name from Samuel Plimsoll. *See* Load Line.

Plinth (Gr. *plinthos*, brick or tile). In architecture, the plain surface under the base moulding of a column or any other member. In classic building it was a low, square block, and square or octagonal plinths were retained long after circular capitals had become universal. In joinery, the plinth is the broad, flat part

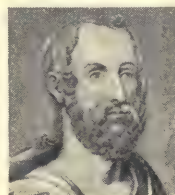
of a base board. *See* Architecture; Column; Masonry.



Plinth beneath
base of a column

Pliny (A.D. 23-79). Roman soldier and writer, whose full name was Gaius Plinius Secundus. He was called Pliny the Elder to distinguish him from his nephew. Born at Novum Comum (Como), he went to Rome at an early age, and, having entered the army, held a cavalry command in Germany. He returned to Rome in 52, and, after some years spent in his native place,

was in 67 appointed procurator in Spain. His last official post was that of commander of the fleet at Misenum, when he met his death at the eruption of Vesuvius, which he



Pliny the Elder,
Roman writer

had gone on shore to examine. His nephew in his *Letters* has left a detailed account of his end. A man of unwearied industry, he was a prolific writer.

In addition to a handbook on using the lance, histories of the wars with Germany and of his own times, a manual of rhetoric, and a grammatical and stylistic treatise, he was the author of an encyclopedic work entitled *Natural History* (in the widest sense) in 37 books, dedicated to the emperor Titus in 77, in the compilation of which he read more than 2,000 volumes. After a general introduction, a sketch of the phenomena of the universe, and a gazetteer, the work deals with anthropology, zoology, botany, materia medica, mineralogy, painting, and sculpture. The whole is an ill-arranged collection of notes, but in the Middle Ages it was much read and imitated. *See* *Natural History*, Eng. trans. with notes, J. Bostock and H. T. Riley, 1855-57; *Pliny's Chapters on History of Art*, Eng. trans. W. Jex-Blake, 1896.

Pliny (A.D. 61-c. 113). Roman writer, whose full name was Gaius Plinius Caecilius Secundus. He was called the Younger to distinguish him from his uncle. Born at Novum Comum (Como), he was adopted by his uncle, from whom

he received an excellent education. Beginning as a pleader in the law courts, he had a successful public



Pliny,
Roman writer
From a statue

career, his correspondence with the emperor Trajan when he was governor of Bithynia (c. A.D. 111) showing him to be possessed of high ideals of duty, though narrow in outlook and lacking in initiative.

This correspondence is of peculiar interest, inasmuch as it contains Trajan's rescript on the treatment of Christians. Another letter is that to Tacitus describing the eruption of Vesuvius in 79 in which the elder Pliny lost his life. Pliny's Letters, which were published in nine books, suffer from the fact that they were obviously written for publication; to a certain extent they lack freshness and spontaneity. Yet they are of great value for the light they throw upon the life of the time. See Letters, with Eng. trans. by W. Melmoth, revised by W. M. L. Hutchinson, 1915.

Pliocene (Gr. *pleion*, more; *kainos*, new). In geology, name given to the uppermost division of the Tertiary system. Pliocene deposits are chiefly found in Europe, especially in France, Spain, Italy, Greece, and on a smaller scale in England, Belgium, etc. Norfolk and Suffolk crag, the Coralline crag, etc., consisting of shelly sand and clays, represent the pliocene deposits in England. The pliocene is comparatively poorly represented in N. America, though the Merced series of San Francisco run to a thickness of 6,000 ft.

The pliocene deposits, the accumulations of shallow seas, and the estuaries of large rivers, are rich in fossils, particularly of mollusca, extinct fishes, reptiles, amphibians, and birds. The remarkable fossil of *Pithecanthropus erectus* probably belongs to this geological epoch (q.v.). See Tertiary.

Plock. Dist. of Poland. It is bounded by E. and W. Prussia and the dists. of Lomza and Warsaw, and is watered by the Vistula and the Nareff. Agriculture is the chief occupation of the people, rye, potatoes, and sugar-beets being the chief crops. Its area is 3,641 sq. m. Pop. 790,000. Pron. Plotsk.

Plock. Town of Poland, capital of the dist. of the same name. It stands on the right bank of the Vistula, 60 m. N.W. of Warsaw. There are manufactures of agricultural implements, matches, sugar,

and soap; grain, timber, and sugar-beet are exported. The 12th century Romanesque cathedral contains tombs of Polish dukes and kings. Plock was formerly the capital of the principality of Masovia. There is steamer traffic by river to Warsaw. Plock was captured by the Germans in their invasion of Poland, Nov., 1914, and was the scene of a fight between Bolshevik and Polish troops, Aug., 1920. Pop. 31,000, mostly Jews.

Ploegsteert. Village and wood of Belgium, in the prov. of Flanders. The former is 8 m. S. of Ypres, and 3 m. N. of Armentières, and before the Great War contained about 5,000 inhabitants. Both village and its adjacent wood, 2 m. in length, figured prominently in the operations conducted by the British in the Ypres salient. After changing hands several times in 1914 they were for the next three years in the British front line, and the scene of bitter fighting with the Germans. Captured by the latter in 1918, they were finally retaken by the Allies in Sept. of that year. It was known to the British troops as Plug Street. See Ypres, Battles of.

Ploeshti, **PLOESTI**, or **PLOESCI**. Town of Rumania, capital of the dept. of Prahova, 35 m. almost due N. of Bukarest. It was, until 1916, one of the centres of the great Rumanian oil industry, and as a junction of railways and roads was strategically important. During the Great War it was captured by the Austro-Germans, Dec. 6, 1916. Pop. 57,000.

Plombières. Town and watering-place of France. In the dept. of Vosges, it stands on the valley of the Augronne, 7 m. from Remiremont, and is famous for its mineral springs. Good for gout, rheumatism, and nervous complaints, these were known to the Romans, and there are remains of their extensive baths. Napoleon III, by frequent visits to Plombières, made it fashionable, and it was here, in 1858, that he arranged with Cavour to assist Sardinia against Austria.

The springs, 27 in number, are the property of the state. The chief buildings are the bathing establishments, casino, and others for the comfort and pleasure of visitors. The chief street is the Rue Stanislas, which took its name from Stanislas, duke of Lorraine. Pop. 2,000.



Plombières, France. One of the principal Roman baths, in Rue Stanislas, the chief thoroughfare

Plöner See. Lake of Schleswig-Holstein, Germany. Midway between Kiel and Lübeck Bay is a group of lakes of glacial origin set amidst beech woods. The largest are Eutin and the Great Lake of Plön; others are Lanker, Keller, and Diek. The great lake is 6 m. long, 5 m. wide; on its shores is Plön, a steamer station, which reaches W. to the small Plön lake.

Plotinus (A.D. 204-269). Chief representative of neo-Platonism. Born at Lycopolis, of a Roman family settled in Egypt, in 244 he accompanied the emperor Gordian on his expedition against the Persian king Shapur. He afterwards settled in Rome, where he taught and lectured with success, and died in Campania. His philosophy, described in his *Enneades*, is a development of the Platonic theory of ideas, combined with Aristotelianism, Stoicism, Oriental mysticism, and the theory of emanation, or efflux from the godhead. See Ethical Treatises, with Porphyry's Life of P., Eng. trans. S. Mackenna, 1917; The Religious Philosophy of P., 1914; The Philosophy of P., W. R. Inge, 1918.

Plough. Tillage implement. It works by cutting and turning over "furrow slices" for exposure to the action of the weather. The backbone of the plough is a slightly bent bar, the beam, to which the following parts are attached: (1) Hake and chain, to which the horses are coupled. (2) Wheels—a furrow wheel to run in the furrow, and a smaller land wheel to move along the unploughed side. The relative height and horizontal distance between these can be adjusted, so as to regulate the depth and breadth of the furrow. (3) Skim coulter, a sort of little ploughshare, is used when it is desired to pare off surface vegetation or turn in a top dressing of manure. (4) Coulter, a knife for making the vertical cut in the furrow slice; its length and angle can be adjusted, and it is sometimes in the form of a revolving cutting disk. (5) Strong iron body, the

frame, to which the remaining ploughing parts are fixed. (6) Handles, or stilts, used by the ploughman for guiding the plough.

The chief part attached to the body is the breast or mould-board, made of cast iron and curved in such a way that it turns over the furrow slice. To the front end of this is fixed the ploughshare, made of chilled steel, and used for making the horizontal cut in the separation of the furrow slice. Shares of various shape are in use for dealing with different classes of land. Some single-furrow ploughs used on adhesive soil possess one wheel only, others—swing ploughs—have no wheels, while others again are provided with a sort of joint giving lateral movement to the front part, so that turning is facilitated.

One-way ploughs can be reversed at the end of the field, so that turning is obviated and a smaller area is left uncultivated. Double-furrow ploughs, drawn by three horses, are provided with a pair of shares, while multiple ploughs have three or four shares, and are used for shallow work. There are also several other types, adapted for special purposes. Disk ploughs, much used in bringing land under cultivation for the first time, are equipped with two or more saucer-shaped steel disks, which take the place of shares and are set obliquely to the direction of movement. Subsoil and trench ploughs are used for deep cultivation, while the names of the ridging and potato-raising ploughs explain themselves. See Agriculture; Bolivia; Egypt.

Ploughing. Method of preparing the soil for crops. It consists in breaking up the earth and exposing a fresh layer to the effect of air, sun, and rain. Its necessity was discovered at a very early date, and it has been one of the most universal, constant, and important of human occupations.

In ploughing a field it is usual to divide it into sections of equal length, separated by furrows, which vary in width according to the lightness or heaviness of the soil, but which good ploughmen always draw straight. The earliest ploughing took the form of pulling an instrument, not unlike a hoe, through the ground, sometimes by oxen. Later, horses were employed and the ploughs improved, but for many hundreds of years the changes were very slight. Soon after 1850 steam was introduced as a motive power, and large areas in the U.S.A. and other new countries were ploughed by engines each pulling a number of instruments. See Agriculture.

Plough Monday. In England, the Monday after Epiphany, the first Monday after Twelfth Day, after which the rustic's labours, symbolised by the plough, are resumed after the Christmas holidays. It was customary on that day, particularly in the N. and E. of England, for the ploughmen, decked with ribbons and sometimes wearing their shirts outside, to yoke themselves to a plough and drag it from door to door, begging plough money. In London a grand court of wardmote is held by the lord mayor at the Guildhall on Plough Monday, followed by a banquet.

Plover. Name given to a large family of shore birds, including the plovers proper, stilts, oystercatchers, curlews, sandpipers, godwits, snipe, and others. Numerous species occur in Great Britain. The golden plover (*Charadrius pluvialis*) has greyish-black plumage spotted with yellow on the upper parts, and black below, and is about 11 ins. long. It is not common, especially in the S. counties, but it breeds in many localities in the N., nesting on the ground among the heather. It is highly



Plover. Hen of the Kentish plover, *Aegialitis cantiana*

esteemed for the table, and for this reason is given little chance of increasing in numbers.

The grey plover (*Squatarola helvetica*) closely resembles it in size and appearance, but lacks the yellow spots. It no longer breeds in Great Britain, but is found near the shore as a winter migrant. The Kentish plover (*Aegialitis cantiana*) is small and pale in colour, with black and white head, and occurs in summer along the coasts from Sussex to Yorkshire. The ringed plover (*Aegialitis hiaticula*) is distinguished by its black and white collar, and is nearly eight ins. long. It is common around the coasts, where it feeds upon small crustaceans, nesting in the sand or shingle a little above high-water mark.

The green plover is very common, and is better known as the peewit or lapwing (*q.v.*). See Dotterel; Egg, colour plate.

Plowden, ALFRED CHICHELE (1844-1914). British lawyer.

Born at Meerut, Oct. 21, 1844, and educated at Westminster and Brasenose College, Oxford, he was called to the bar in 1870, and after practising for eighteen years, during which period he was recorder of



A. C. Plowden, British lawyer
Elliott & Fry

Wenlock, 1878-88, was appointed metropolitan police magistrate at Marylebone court, a post he held until his death, on Aug. 8, 1914. Plowden was the best known magistrate of his time, his wit, wisdom, and kindness gaining for him the title of "The London Cadi." He published *Grain or Chaff*, 1903.

Plug. Word used by engineers for (1) a tapered block of suitable material for inserting in a tapered hole to form a water- or air-tight joint; (2) piece of metal with a tapered or split end for inserting between two metal plates or blocks to make a connexion in an electric circuit. A tapered end fits into a tapered socket. By slightly wedging apart the two halves of a split end, it may be sprung into a parallel socket to make a tight connexion.

Plug Street. Popular name for the village and wood in Belgium correctly called Ploegsteert (*q.v.*).

Plum (*Prunus*). Fruit-bearing trees of the natural order Rosaceae. The genus includes the damson, greengage, and sloe. The ordinary plum (*Prunus domestica*), though found wild, is not a native of Britain; it usually forms the stock upon which are grafted the choicer varieties, of which there are now in cultivation close upon two hundred. The plum flourishes in a fairly light soil, with a mixture of lime for preference. The more highly cultivated sorts are fond of shelter, and are therefore best grown as bushes, or espaliers, fans, or cordons against walls.

They are propagated by grafting in springtime, or by layering in autumn. In dry seasons the surface of the soil round the stems of the trees should be mulched with manure, as the plum is a shallow-rooting subject. Standard plum trees should be planted from 15 ft. to 20 ft. apart; espaliers 12 ft. apart. Standard plum trees need only sufficient pruning to keep the tree open in

order to admit light, air, and sunshine. On walls the pruning necessary to keep the trees in shape will be found ample for all needs. See Bladder Plum; Damson; Fruit Farm; Greengage; Sloe.

Plumage. Collective term for the feathers with which birds are clothed. The plumage of young birds differs from that of adults of the same species, and after they have reached maturity they are subject to periodical moultings, in some species once, in others twice a year. In 1922 a plumage act was passed by Parliament with the object of protecting such birds as the egret from wanton destruction. See Birds, colour plate; Feather; Protective Colouring; colour plate.

Plumbaginaceae or **PLUMBAGO** FAMILY. Natural order of herbs and a few shrubs, natives of all regions. They have regular flowers, with a tubular, five-lobed calyx, and five petals with long claws which are sometimes united to form a tube. There are about 200 species in eight genera, which include the familiar Sea Pinks (Statice) and Sea Lavenders (Limonium).

Plumbago (*Plumbago capensis*). Climbing or trailing shrub of the natural order Plumbaginaceae,



Plumbago. Flowers of *P. capensis*

native of S. Africa. It has alternate, oblong leaves, and short spikes of pale blue, salver-shaped flowers. *P. rosea*, from the East Indies, has an erect stem, branching above, and long spikes of rosy-scarlet flowers. The Chinese plant known in gardens as Lady Larpent's plumbago (*Ceratostigma plumbaginoides*) belongs to an allied genus.

Plumbago. Alternative name for the mineral form of carbon more commonly known as graphite (*q.v.*). See Lead.



Plum. Varieties of the fruit produced by cultivation. 1. Monarch. 2. Rivers' Early. 3. Victoria. 4. Golden

Plumber (Lat. *plumbum*, lead). Term for a worker in lead, but now used for any workman who is concerned with the fixing and mending of pipes, etc., used for water supply, and sanitary fixtures of a building. A plumber's work also consists in protecting roofs with sheet lead, the fixing of water gutters and other rain-water conductors, pipes, and their connexions. The term plumber is occasionally used for workmen who fit any kind of piping.

Plumbers' Company, THE. London city livery company. Its records date from about 1365, but it was first incorporated in 1611. The hall in Chequer Yard, Dowgate Hill, rebuilt 1830, was removed in 1865, and the site is covered by Cannon Street rly. Plumbers' Co. arms station. In recent years the company has done much to promote the technical education and registration of plumbers. The office is at 15, Great St. Helen's, E.C. See The Plumbers' Company in Ancient and Modern Times, 1902.



Plumbing. Literally, working in lead. Vitruvius (Bk. viii, cap. 6) mentions the "deep pallor" of plumbers, and infers the unhealthiness of their occupation. Plumbing was therefore in his day a recognized business; but it was not until after the Renaissance that leadwork in buildings came into general use. Modern plumbing is (1) structural, as in the formation of lead cisterns, coverings to roofs, of lead gutters, of flashings to cover joints (as between chimney and roof, etc.); and (2) sanitary, as in the fixing and jointing of pipes used for flushing closets, filling and emptying baths, installing pipes for water-supply, etc.

In (1) the processes are beating out sheet-lead to the required shape and thickness; jointing it with solder or by "burning" together the edges of the sheets;

fixing it, with tacks or otherwise, to various materials. This union may be effected with a lead-burning machine, a blowlamp or blow-pipe, or a particular form of soldering iron. In (2) the bending, cutting, and jointing of pipes are the chief operations. Blowpipe joints are not much in favour, "wiped" joints being preferred.

In joint-wiping, the end of one pipe is expanded to admit about three-quarters of an inch of the other pipe. Molten solder (two parts lead, one part tin) is then poured on in such a way as to cement the union, the solder being dexterously wiped to neat shape with a piece of stout fustian or similar cloth. Many unsuccessful attempts have been made to pass through Parliament a Bill for the compulsory registration of plumbers, and many local authorities refuse to employ or recognize any but "registered plumbers," who obtain that title by passing certain specific examinations conducted by the Plumbers' Company. See Building.

Plume Bird. Name sometimes applied to birds of paradise of the genus *Epimachus*. See Bird of Paradise.

Plumer, HERBERT CHARLES ONSLow, 1st BARON (b. 1857). British soldier. Born March 13, 1857, a son of Hall Plumer of Torquay, he entered the army, York and Lancaster Regt., in 1876, and served with it in the Sudan in 1884. Having reached the rank of major, he came into the public eye by raising and commanding a mounted force during the rising of the Matabele

in S. Africa in 1896. He served in the S. African War, 1899-1902, at the end of which he was made a major-general. From 1902-14 Plumer was constantly employed, commanding first a brigade and then a division at home, and serving as quartermaster-general and a member of the army council, while, 1911-14, he was in charge of the northern district. In 1906 he was knighted.

In Jan., 1915, Plumer was sent to take command of the 5th army corps, and in the following May was appointed to the 2nd army. From Nov., 1917, to March, 1918, he was in charge of the British force in Italy, after which, having returned to the 2nd army, he remained on the western front until Dec. He marched to the Rhine in Dec. and returned to England in April. In 1919, for his services, he was made a field-marshal and a baron. He was governor of Malta from 1920 to 1924. During much of his period on the western front Plumer's army was holding the front around Ypres, and the attack

is a racecourse at which meetings are held from September to May. There is also a Plumpton in Yorkshire (W.R.), 2 m. from Knaresborough.

Plumtre, EDWARD HAYES (1821-91), British divine. Born in London, Aug. 6, 1821, he belonged



Edward Plumtre,
British divine

to an old Nottinghamshire family, several members of which obtained distinction. Educated at University College, Oxford, he was ordained in 1847, and was made chaplain of King's College, London. After being professor of pastoral theology (1853-63) and of exegesis (1863-81) at King's, he was, 1881, chosen dean of Wells. He died Feb. 1, 1891. A man of many interests, Plumtre was a member of the committee appointed to revise the O.T., and was lecturer on the Septuagint at Oxford. In addition to his theological writings, he wrote a *Life of Ken*, 1888, and of *Dante*, ed. A. J. Butler, 1900; translated *Dante and Sophocles*, and wrote verse.

Plum Pudding. National Christmas dish in England. It is composed of raisins, sultanas, currants, lemons, chopped apples, candied peel, sugar, breadcrumbs, flour, suet, salt, spice, and eggs. These mixed materials are frequently, though not necessarily, moistened with beer or stout and brandy. The quality of the pudding largely depends on the stirring and mixing. When ready it is either put into a pudding basin with a cloth tied tightly over it, or boiled in a cloth. In either case the time of boiling should be from six to eight hours. In Elizabethan times neither cloth nor basin was used, and the dish from which the Christmas pudding has evolved was known as plum porridge. See *Cookery*.

Plumstead. London dist. Part of the met. bor. of Woolwich, it is in the co. of Kent, 10½ m. from Charing Cross, on the S.E. & C.Rly., and is served by tramway and motor-bus. The church of S. Nicholas, with early 17th century square tower, was displaced in 1864 as the parish church by S. Margaret's, built 1858. In the High Street are public baths, public library, opened 1904, central hall, and Woolwich Union Workhouse and Infirmary. In addition to the marshes, the open spaces include Plumstead Common, Shoulder of

Mutton Green, and Bostall Heath, acquired for the public in 1877-78; and Bostall Woods, acquired in 1892, in all nearly 134 acres. Woolwich Arsenal football ground, once in the dist., is now at Highbury. Pop. 71,200.

Plumstead manor was given by King Edgar in 960 to the abbot and monks of S. Augustine's, Canterbury, and in the 18th century passed to Queen's College, Oxford. The marsh was walled by the monks of Lesnes or Lessness Abbey, but after 1527 its 2,000 acres lay under water for 36 years, until the work of reclamation was begun in 1563 by Giacomo Aconzio. Part is used for gun-testing.

Plunket, WILLIAM CONYNNGHAM PLUNKET, 1ST BARON (1764-1854). Irish lawyer. Born at Enniskillen,



Plunket

July 1, 1764, he studied law at Dublin University and Lincoln's Inn, London, and was called to the Irish bar in 1787. After practising with distinction, Plunket entered the Irish Parliament in 1798 in the Whig interest, and strongly opposed the Union. Appointed Irish attorney-general in 1805, he resigned two years later, holding the office again in 1812. He first sat in the British Parliament in 1807, as a champion of Catholic Emancipation. From 1812-27, with one short exception, he represented Dublin University, and in the last-named year was appointed chief justice of the common pleas, entering the House of Peers as Baron Plunket. In 1830 he was made lord chancellor of Ireland, retaining the office for 11 years, excluding 1834-35. He died Jan. 5, 1854.

Plunket, WILLIAM CONYNNGHAM PLUNKET, 4TH BARON (1828-97). Irish prelate. A son of the 3rd



4th Baron Plunket,
Irish prelate

Baron Plunket, he was born in Dublin, Aug. 26, 1828. Educated at Cheltenham and Trinity College, Dublin, he was ordained in 1857. In 1869 he became precentor of S. Patrick's Cathedral, Dublin; in 1876 was consecrated bishop of Meath, and from 1884 to 1897 was archbishop of Dublin. A leader among the evangelicals, he took a



1st Baron Plumer of Messines,
British army commander in the
Great War

Russell

on Messines (q.v.), which he conducted in June, 1917, was regarded as one of the best managed operations of the war. See *Cologne*; *Ypres*, *Battles of*.

Plummet (Fr. *plombet*). Piece of lead at the end of the lead line by means of which soundings are taken. See *Navigation*.

Plumpton. Village of Sussex, England. It is 44 m. from London and 4 from Lewes, with a station on the L.B. & S.C. Rly. The church is mainly Early English, and there

prominent part in resisting disestablishment and afterwards in directing the Church on its altered career. He succeeded to the title in 1871 and died April 1, 1897, when his son, William Lee Plunket, became the 5th baron. From 1904-10 he was governor of New Zealand. *See* Memoir, F. D. How, 1900.

Plunkett, Sir Horace Curzon (b. 1854). Irish statesman. Third son of the 16th Baron Dunsany, he



Sir Horace Plunkett,
Irish statesman

was educated at Eton and University College, Oxford, and spent ten years ranching in the U.S.A. A strong supporter of co-operative methods in agriculture, he

founded the Irish Agricultural Organization Society, 1894, in connexion with which he became widely known in Ireland. He sat as Unionist member for Dublin co. S., 1892-1900, and acted as chairman of the Irish Convention, 1917-18. Among his writings on political and economic subjects are *Ireland in the New Century*, 1904; *A Better Way*, 1914; *Home Rule and Conscription*, 1918. *See* Sir H. Plunkett, E. E. Lysaght, 1916.

Pluralism. Practice of holding more than one ecclesiastical benefice at the same time. The abuse of pluralities arose very early in the history of the Church, for it was forbidden by the Council of Chalcedon, 451, and again by the second council of Nicea, 787. It was forbidden in England by Act of Parliament in 1529, but during the Georgian period it revived to a scandalous extent.

Acts of 1838 and 1885 made pluralities illegal, except in respect of very small livings with few parishioners, in which case the archbishop can grant a dispensation, if he thinks fit, for a clergyman to hold two livings, providing that the churches are within four miles of each other, and that the annual value of one of the livings does not exceed £200. *See* Benefice; Ecclesiastical Law.

Plural Voting. Name given to an electoral system that allows a man to have more than one vote at the same election. In the United Kingdom before 1919 there was a certain amount of plural voting at parliamentary elections, as a man could qualify as a landowner, although not as a resident, in several constituencies. By the Representation of the People Act of 1918 it was practically abolished. A voter



Pluto. Statue of Pluto and Persephone by Bernini
Borghese Museum, Rome

in the United Kingdom can now under certain conditions have two votes, but no more. *See* Vote.

Plush (Fr. *peluche*, from Lat. *pilus*, hair). Fabric with a pile longer and more open than velvet. It is used for cloaks and upholstery. Plushes have a pile normally of silken mohair. Hatter's plush, used to make men's silk hats, is a special variety.

Plutarch (c. A.D. 48-122). Greek biographer and philosopher. He was born at Chaeronea, in Boeotia, and he appears to have spent a considerable time in Rome, but his declining years were passed in his native town. Plutarch's fame rests almost entirely on his *Parallel Lives*, a collection of biographies of notable men (with the exception of four) in pairs, one Greek, the other Roman. The resemblance between the pairs is often slight. They are of great historical interest, much of the matter being based on authorities now lost. Shakespeare drew upon Plutarch through North's translation for his classical plots. Plutarch was also the author of numerous essays on a wide variety of subjects, grouped under the general title *Moralia*.



Plutarch,
Greek biographer

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Pluto (Gr. *Ploutōn*). Roman name for the god of the lower regions, more commonly known to the Greeks as Hades. He is regarded as (1) the stern and relentless ruler of the horrible underworld; (2) as a beneficent chthonian deity, who distributes to mankind the products of the earth, both mineral and grain. His wife was Persephonē, whom he carried off while she was gathering flowers at Enna in Sicily. He is not to be confused with Plutus, the god of wealth, although etymologically they are identical. *See* Hades; Persephonē; Tartarus.

Pluto Monkey (*Cercopithecus leucampyx*). Species of guenon monkey, better known as the black-bellied monkey. It occurs in Central Africa, and the general colour of its hair is black, grizzled on the head and back. It is conspicuous by its bushy whiskers.



Pluto Monkey. Central African monkey, conspicuous for its bushy whiskers

Plutonic Rocks. In geology, name given to those igneous rocks which have consolidated at considerable depths below the surface of the earth, and have been brought to the surface by various agencies. They are distinguished from the volcanic rocks which have formed near the surface. Granites are a typical example of plutonic rocks. *See* Igneous Rocks.

Pluviôse. The fifth month in the year as rearranged during the French Revolution. It began on the 20th or 21st of Jan., and lasted 30 days. The word means the month of rain.

Plymouth. Co. and parl. bor. of Devonshire, England. Since 1914 it has included Devonport and East Stonehouse. It has a fine situation at the mouth of the river Plym at the head of



Plymouth. Plan of the district, showing the principal docks and shipbuilding yards in Plymouth and Devonport:

Plymouth Sound, one of the deep and commodious estuaries formed by the submergence of a river valley characteristic of S.W. England. It is served by the L. & S.W. and G.W. Rlys., the docks belonging to the latter company; within the breakwater a large number of ships can find safe anchorage in Sutton Pool, Millbay, the Catwater, the Hamoaze, in readiness to enter the floating basin, graving docks, or to reach the dock wharves.

Plymouth is a mail station for fast traffic from overseas to London, and is one of the chief fishery stations on the S. coast. The naval station is at Devonport. Plymouth Hoe is a ridge between Millbay and Sutton Pool; it is the property of the town council, and contains a fine statue of Sir Francis Drake, and part of the old Eddystone Lighthouse as a monument to Smeaton. On the Hoe, too, is the Citadel. The buildings include S. Andrew's Church, the Guildhall, and the Custom House.

Plymouth was the first town in England incorporated by Act of Parliament, Nov. 12, 1439. During the mayoralty of Sir Francis Drake in 1585 were constructed the

municipal waterworks, reputedly the oldest enterprise of the type in the country. Called by the Saxons Tamarworth, and named Sutton by the Domesday chroniclers, the town became Plymouth in the reign of Henry VI. From the port sailed the Black Prince for France and the victory at Crecy; Drake, Hawkins, and Cook

on their celebrated voyages. Hence sailed the Mayflower in 1620. From 1642 to 1646 the town was frequently



Plymouth, Devonshire. View of the town looking inland from the Hoe; in the foreground is the S. African War Memorial. Top, right, Plymouth Hoe

Frith



Plymouth arms

and desperately attacked by the Royalists. Three members are returned to Parliament. The municipality owns the tramways. The town has "adopted" Estaires. In 1921 a memorial, a bronze group of statuary, to the R.M.L.I. was erected on the Hoe. Pop. 214,000. See Devonport; consult also History of Plymouth, R. N. Worth, new ed. 1890.

Plymouth. Town and port of entry of Massachusetts, U.S.A., the co. seat of Plymouth co. It stands on Plymouth Harbour, a branch of Massachusetts Bay, 36 m. S.E. of Boston. It was the landing place of the Pilgrim Fathers in 1620, and the spot at which they disembarked is marked by Plymouth Rock, a granite boulder, now covered by a fine granite canopy. Other objects associated with the Mayflower Pilgrims are a national monument, 1858-88, and Pilgrim Hall, which houses a collection of relics. Pop. 13,000. See Pilgrim Fathers.

Plymouth. Borough of Pennsylvania, U.S.A., in Luzerne co. It stands on the Susquehanna



Plymouth, Massachusetts. The old burying ground in which are buried some of the Pilgrim Fathers

river, 4 m. W. of Wilkesbarre, and is served by the Delaware, Lackawanna, and Western Rly. It lies in a valuable anthracite region, and its chief industries are associated with the working of coal. Plymouth was settled in 1768, and was incorporated as a borough in 1866. Pop. 16,500.

Plymouth, EARL OF. British title borne since 1905 by the family of Windsor-Clive. In 1675 Charles II gave this title to an illegitimate son, but he died five years later and it became extinct. In 1682 it was bestowed on Thomas Hickman-Windsor, Lord Windsor of Stanwell, an old royalist who had inherited his barony, one dating from 1529, through his mother. It was held by his descendants until the 8th earl died in 1843, when it became extinct. The barony remained in abeyance until 1855, when it was awarded to a descendant of the Windsors,

Harriet, wife of Robert Henry Clive, a son of the 1st earl of Powis. In 1869 her grandson, Robert George Windsor-Clive (1857-1923), became 14th Baron Plymouth, and in 1905 earl of Plymouth. He was first commissioner of works 1902-5. He owned valuable land in and around Cardiff. The eldest son is known as Lord Windsor.

Plymouth Brethren. Protestant sect, which arose about 1830 in Plymouth and Dublin. One of its chief founders was John Nelson Darby (*q.v.*), after whom the Brethren were formerly called Darbyites. He gave up his position in the Church and travelled about the country, forming small societies of Evangelical Christians for Bible study and the promotion of spiritual life. These gradually formed small congregations, which met in houses and halls for worship. The Plymouth Brethren have no organic unity and no creed. In doctrine they are Calvinistic; they usually baptize by immersion; and observe the "breaking of bread" every Sunday. They object to any fixed ministry.

Plymouth China. Variety of chinaware. It is a hard paste biscuit ware, in which kaolin and flintstone are used, dipped in glaze, and fired at a high temperature. It was manufactured at Plymouth by William Cookworthy, from 1768-74. The table services, salt cellars, and centre pieces generally bear rock-work and shell decoration. See Pottery.

Plymouth Rock. Popular "utility" breed of fowls, originating in the U.S.A. from crossing a Black Java hen with a Grey Dominique cock. Robust, hardy birds, their blue-grey plumage is uniformly barred with black; the bill, legs, and feet are yellow, and the single comb is upright. Cocks weigh 10 lb. or 11 lb., and the hens a couple of lb. less. Capital layers, their eggs are large and brown. The chickens are reared easily and soon make good table birds, though the flesh is not con-

sidered so good as that of the Houdan or the Dorking. See Fowl, colour plate.

Plymouth Sound. Deep inlet of the English Channel, between Cornwall and Devonshire. Into it



Plympton, Devonshire. Church of S. Mary, in Plympton St. Mary, from the south-west

Frith

flow the river Tamar from the W., and the river Plym from the E. The estuary of the Tamar, known as the Hamoaze, is 4 m. long by $\frac{1}{2}$ m. wide, and is the chief anchorage for war vessels in Plymouth Harbour; while the estuary of the Plym, called the Catwater, is a capacious anchorage for mercantile vessels. The sound is protected by a breakwater nearly 1 m. long.

Plympton. Market town of Devonshire, England. It is 5 m. from Plymouth on the Plym, and consists of two adjacent places, Plympton St. Mary and Plympton St. Maurice, or Plympton Earl's. It has a station on the G.W. Rly. The buildings include a fine old church, and a grammar school, at which Sir Joshua Reynolds, who was born here, was educated. Plympton had a castle and an Augustinian priory. It was made a borough in the 13th century, and from 1295-1832 sent members to Parliament. One of the Stannary towns, it had fairs and markets. Its privileges as a borough were taken away in 1859. Pop. 5,000.



Plymouth Rock, cross between Black Java and Grey Dominique

Plymstock. Village of Devonshire, England. It stands on Plymouth Sound, 3 m. from Plymouth. Here is the Perpendicular church of S. Mary and All Saints, restored in the 19th century; it has a Norman font, and some memorials to the Harris family.

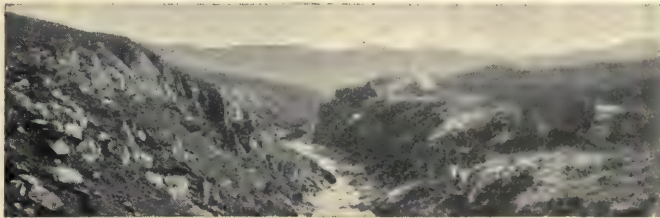
Plynlymmon. Mountain of Wales. It stands on the borders of Cardiganshire and Montgomeryshire, and has three summits, the highest being 2,465 ft. high. The word is said to be a corruption of a Celtic term for five rivers, as five rivers rise hereon—Wye, Severn, Rheidol, Ystwyth, and Llynfnant. On and around the mountain are a number of bogs.

Plywood. Name given to boards built up of plies or thin veneers of wood. These are cemented or glued together with the grain of each ply placed at right angles to that of the ply on either side of it. The special advantages of plywood, in comparison with solid timber, are its extreme lightness, great strength, the exceptional widths to be obtained without a joint—often up to 84 ins.—and the counteracting of the natural tendency of timber to warp and split.

In the first operation of the manufacture of plywood, a log is revolved in a specially constructed lathe, against a horizontally placed knife, which cuts a continuous "peeling" from the surface of the log. This peeling, or ply, is then cut into the particular size desired, and after drying, two or more plies, according to the final thickness desired, are cemented together under pressure. For special reasons more than one variety of wood may be used to form the finished article.

Plywood is used for all kinds of purposes, chief among which are wall and ceiling panelling, furniture and chair seat manufacture, and box-making, and in the construction of aeroplanes. Although the records of its origin are somewhat obscure, it is reported to have been used in 2-ply form by the ancient Egyptians, for mummy cases. See Joinery; Timber.

Pneumatic Appliances. Name given to that class of machine or instrument which depends largely upon compressed air for power. Pipes conveying it need not be protected against cold, as it cannot freeze or condense under ordinary conditions. If it escape it is perfectly inoffensive. Owing to its expansibility it may be employed in engines, which differ only in detail from steam engines. In fact, many forms of motors will operate as well



Plynlymmon, North Wales. Distant view of the mountain

with air as with steam, though perhaps not so economically.

AIR COMPRESSORS. Air is compressed in one, two, three, or four stages, according to the final pressure which is required. The compound, or two-stage compressor, is suitable for pressures up to 100 lb. per sq. in. As a rule isothermal compression is used, i.e. the air is kept cooled to as near atmospheric temperature as possible by cold water circulated through jackets outside the cylinders, and in coolers through which the air passes between any two stages of compression. The efficiency of the compressor depends largely on the efficiency of the cooling, as a given weight of heated air requires more power to compress it; or, to state the matter differently, the work put into it is partly lost by the subsequent cooling and loss of pressure in the container.

Fig. 1 represents diagrammatically a four-stage compressor. Two compressing cylinders are used. The upper sides of pistons P^1 and P^2 are exposed fully, whereas the lower, owing to the pressure of the large plungers, have a much smaller annular face. Air enters by valve A into space W, is compressed during the upward stroke of P^1 , and passes out through valve B to the first cooler; while air already compressed is drawn into space X. On the downward stroke of P^1 the air in X undergoes the second stage of compression, and is forced out into the second

cooler. The process is repeated in space Y, and again in Z. C, F, and G are the requisite valves.

Cooling means a great loss of energy, which in extreme cases may reach 65-70 p.c. A considerable proportion—40-50 p.c.—of this loss can be made good, however, by re-heating the air just before use, as is done in compressed-air locomotives and torpedoes. The latter are provided with a small heater, which comes into action automatically and burns liquid fuel in contact with the air. The result is a gain in power of 100 p.c., of 22 p.c. in maximum speed, and of 70-100 p.c. in useful range. (See Compressed Air.)

PNEUMATIC HAMMERS. The pneumatic hammer is a heavy piston moved to and fro by compressed air inside a cylinder, furnished with a handle and a thumb valve. At the end of an outward stroke it strikes against a loose piece, which transmits the blow directly, or through a chisel, caulker, or other tool fitted into it. There are two classes of hammers, the small short-stroke, which works at tremendous speed and makes 2,000-12,000 light blows a minute, and the larger long-stroke, giving 800-1,200 heavy blows in the same time. Short-stroke hammers are valveless, the hammer itself opening and closing the ports. A long-stroke hammer usually has an automatic valve, to admit and release air from the ends of the hammer alternately. Short-stroke hammers are invaluable for chipping the surfaces of castings and other metal-work. Riveting is

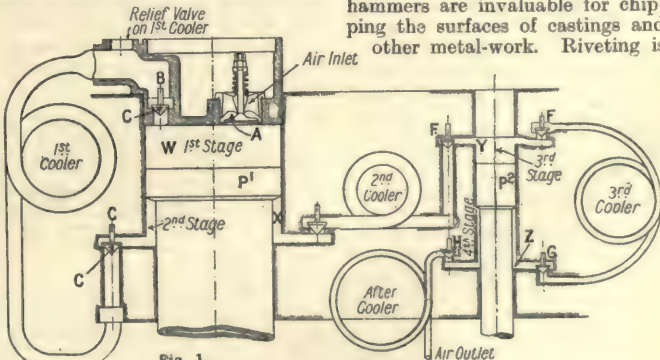


Fig. 1

Pneumatic Appliances.

Diagram illustrating construction of a four-stage air compressor. See text

done with the larger tools, which are able to close rivets up to $1\frac{1}{4}$ in. diameter very quickly, and are most useful in positions where hydraulic riveting is impracticable or over-costly.

Modified forms of hammers are employed in foundries to ram the sand in moulds, and in masons' yards for chipping stone.

PNEUMATIC HOISTS. These are of great use in workshops and foundries for lifting heavy work, castings, etc. Fig. 2 is a sectional view of a vertical oil-controlled hoist, adapted to be slung from a crane by eye E. Chamber A contains oil, some of which, when the hook is pulled down, passes through the non-return valve V and the central fixed pipe into the hollow piston-rod. To raise the load, air is admitted to the under side of the piston through valve V², and the pulley P is rotated by a rope or chain, opening the small needle valve shown, which allows the oil to escape gradually into A. Hoists of this kind are constructed to deal with loads up to five or more tons.

PNEUMATIC ROCK DRILLS. These are generally larger and heavier than pneumatic hammers, are carried on tripods, standards, crossbars, or other supports, and have a mechanism for feeding the drill forwards and rotating it slightly between strokes. The drill is either struck by a loose hammer piston or reciprocated by the piston through a piston-rod and chuck. Drills of the second type have moving air-valves.

Figs. 3 and 4 illustrate one type of Ingersoll-Rand drill and the action of the very ingenious "butterfly" valve used. The valve itself consists of a cylindrical trunnion or body, integral with two flat wings, one on either side, ground to a perfectly true surface. The trunnion rests in bored steel bushings in a valve chest with a free working fit. The wings are able to oscillate slightly about the trunnion as centre. In Fig. 3 the piston is about to make an outward stroke. The upper wing of V



Fig. 2
Pneumatic Appliances. Sectional diagram of pneumatic hoist. See text

has been driven over to the right, closing supply port S¹ and opening port S², as well as exhaust port E². Air enters the cylinder through SS² and drives the piston forward, while the exhaust passes out through EE¹ and E¹. As soon as P uncovers port EE² live air reaches port E², and its pressure at this point on the lower wing balances the pressure on the other wing.

The valve is now in equilibrium, but still kept stationary by the rush of air at S until the piston covers EE¹ and compresses the air in front of it. The pressure, communicated through SS¹ and S¹ to the valve, throws the latter into the position shown in Fig. 4. The piston then travels in the opposite direction, but with less force than during the out-stroke, as its front end has a smaller area exposed to the air. The drill delivers 600 blows a minute. Rotation of the drill is effected by a bar B with external rifle grooves, which projects centrally into and engages with the piston. The head of the bar is controlled by a ratchet R and pawls which allow it to rotate slightly during an out-stroke of the piston, but prevent the piston twisting it while moving inwards. Consequently the piston and the drill make a complete revolution every few strokes.

Small portable air-motors, enclosed in dust-proof cases provided with handles, control-valve, and breast-rests or screw-feed gear, have been generally adopted in engineering shops for drilling, reaming, and tapping holes, and expanding boiler tubes.

PNEUMATIC PAINTING MACHINES. The application of paint, varnish, oil, etc., in the form of a fine air-blown spray has certain advantages over brush-work. The covering speed is much higher; the material is deposited more evenly on irregular surfaces. The air is led from a small compressor, or other source of supply, through flexible tubing to a portable air-tight vessel which contains the pot holding the paint and serves also as air-reser-

voir. The spraying nozzle, connected with the container by two flexible pipes—one for the paint and the other for air—is controlled by a thumb valve. When the valve is depressed, paint is forced by air-pressure through a fine jet and meets a stream of air issuing from another jet, by which it is atomized and blown on to the work. With a paint-sprayer 700-1,000 square ft. can be coated an hour.

SUBSIDIARY USES. Compressed air has been used for the firing of large guns. The first successful application was by Mefford in 1883, who used pressures up to 500 lb. per sq. in. E. L. Zalinski, of the United States artillery, in 1888 produced his so-called dynamite gun, in which pressures of 1,000 lb. per sq. in. were used. Several of these guns were mounted on the coastal defence works of New York and San Francisco, but the system did not come into general use.

In grain elevators the force of air suction is made use of, the grain being drawn through flexible pipes. In pneumatic bells pipes of narrow bore replace the usual electric wires. The pressure of the push button forces a current of air along the pipes and actuates the bell hammer. Pneumatic clocks are a system of synchronous clocks which are connected with the central controlling clock by compressed air. From the central clock air impulses are sent at regular intervals through the connecting tubes, expanding a bellows on each dial and moving the hands. Pneumatic tires are rubber tubes which are kept inflated by air under pressure. See Compressed Air; Tire.

Pneumatic Dispatch. Conveyance of material along tubes by air pressure. The transmission of papers and other articles through pneumatic tubes in carriers was first adopted for public purposes in 1853, when a tube 3 ins. in diameter and 220 yds. long was laid between the London Stock Exchange and the International Telegraph Company's Offices. Since then pneumatic dispatch has been introduced into many postal offices, business premises, stores, hotels, etc.; and many hundreds of miles of tubes are now in constant use.

A carrier is moved through a tube either by creating a partial vacuum in front of it, while exposing its rear end to full atmospheric pressure, or by introducing air at above atmospheric pressure behind it. Where a single tube only is used between the two terminals, the carrier is blown in

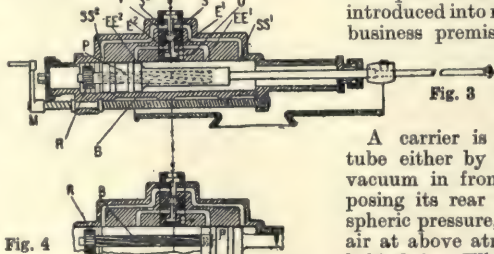
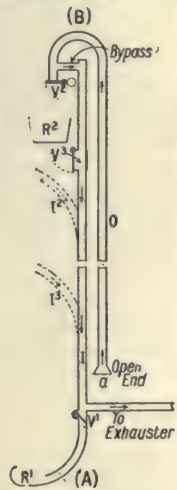


Fig. 4
Pneumatic Appliances. Diagrams illustrating construction of a pneumatic rock drill. See text

one direction and sucked in the other, being controlled from the end towards which a number of tubes converge—e.g. in a cashier's office.

More commonly a separate tube is provided for each direction. The all-vacuum system is represented by an explanatory diagram. Air is constantly exhausted through pipes O and I in the direction indicated by the arrows. To send from (A) to (B), a carrier is entered at a. On



Pneumatic Dispatch.
Diagram explaining
apparatus. See text

reaching (B) it opens V^2 and drops into receiver R^2 . To return it, (B) opens a flap V^1 and places it in pipe I. It forces its way past valve V^1 , which closes automatically behind it, and falls into receiver R^1 . One inward pipe may serve as a main for branches I^2, I^3 , entering it at a trailing angle; but there must be a separate O pipe for each "out" station, unless special automatic switching apparatus is fitted. In another system, used by the British Post Office, compressed air tubes take the carriers outwards, and vacuum tubes bring them back. The same blower supplies air at about 10 lb. per sq. in. to a reservoir feeding the various pressure tubes, and maintains a vacuum of $\frac{1}{4}$ lb. in a vacuum container connected with the return tubes. Pressure in both directions has been adopted for lines with large tubes. The speed of carriers is from 20–30 m. an hour.

For ordinary purposes circular tubes 2, 2½, and 3 ins. in diameter are used; but oval and square tubes are employed for special work. The line tubes of the London Post Office are of lead, enclosed in protecting iron pipes. The large 6, 8, and 10-in. tubes used in the U.S.A. for mail matter are of cast iron. Curved sections are not given a curvature sharper than 1 ft. radius per in. of pipe diameter, and are of seamless brass bored before bending. Carriers are made of brass, vulcanite, or gutta-percha. The body of the carrier is of smaller diameter than the ends, on which are fixed felt rings or disks, exactly fitting the tubes.

Pneumatics (Gr. *pneuma*, vapour, breath). Study of the mechanical properties of gases (q.v.).

Pneumatolysis (Gr. *pneuma*, vapour; *lyein*, to set free). In geology, name given to the formation of minerals by the discharge of gases through the original molten mass. Such gaseous discharges may be easily seen at the time of any volcanic eruption, and the molten lavas are considerably modified as they cool by the gases which pass through them.

The chief gases which act on such molten rocks are carbonic acid, hydrogen, nitrogen, fluorine, chlorine, etc., and water vapour, and they have the effect of breaking up or forming fresh combinations of the primary constituents of the molten discharging mass. The gases combine with the metaliferous minerals in particular and form mineral ores, e.g. copper oxide, ferric chloride, etc. Fluorine acts as a powerful agent, hydrofluoric acid being formed and, acting on feldspars, produces topaz, muscovite, etc. *Pron.* New-ma-tolly-sis.

Pneumogastric OR VAGUS NERVE. Important nerve on each side of the body, which arises from the base of the brain and passes out of the skull through the jugular foramen, an aperture in the base of the cranium. It proceeds vertically down the neck, close to the carotid artery, and enters the thorax. The right vagus passes behind the root of the right lung, where it forms the posterior pulmonary plexus. From this the nerve continues down behind the oesophagus and passes through the diaphragm or large horizontal muscle, to supply the posterior surface of the stomach and give off branches to plexuses of nerves in the abdominal cavity.

The left vagus passes over the arch of the aorta or main blood vessel, and breaks up behind the root of the left lung into the posterior pulmonary plexus. The nerve subsequently makes its way down through the diaphragm in front of the oesophagus, and is distributed to the anterior surface of the stomach, with branches to various nerve plexuses. See Anatomy; Neck; Nerve.

Pneumonia (Gr. *pneumon*, lung). Acute infective disease of the lung. The two chief forms are lobar or croupous pneumonia, and lobular or broncho-pneumonia.

Lobar pneumonia is a widespread and fatal disease. Males are more liable to it than females; it is more common in towns than in rural districts, and poor health, underfeeding, alcoholism, and old age predispose towards the malady.

Exposure to cold or wet is often the immediate cause, but there is good ground for believing that these factors act only by reducing the powers of the body to resist infection. Pneumonia may also occur in the course of, or as a complication of, many other diseases, chiefly phthisis, heart disease, Bright's disease, diabetes, and acute fevers, as typhoid, diphtheria, influenza, and plague. The *Diplococcus pneumoniae*, which was isolated by Fraenkel, is the micro-organism which causes the disease. The first effect of the organism upon the lung is to produce congestion, followed by solidification of parts of the lung, producing the condition known as red hepatisation, which is eventually succeeded by grey hepatisation, after which death, or absorption of the products with recovery, occurs.

The symptoms usually begin with a rigor or shivering fit, and rise of temperature to 104° or 105° F. Sometimes, however, the onset is insidious. Pain in the side is a frequent symptom, respiration is hurried, and there is a dry cough with tenacious blood-tinged expectoration. The temperature remains high for from five to nine days, and then falls abruptly, this constituting the crisis of the disease. The patient then usually sweats profusely, the pulse rate drops, the breathing becomes almost normal, and he passes into a state of comparative comfort. While various complications may arise, and death may occur from collapse, after the crisis, the danger of a fatal termination is now very much less. Complications which may arise are pleurisy, pericarditis, endocarditis, and meningitis. Treatment consists mainly in very careful nursing. The patient should be in the open air, or in a large, well-ventilated room. The diet should be very light, consisting chiefly of milk.

Broncho-pneumonia is an inflammation of the small bronchioles or air-tubes of the lung and of the air vesicles. It may occur as a primary infection, or may be secondary to other diseases of the respiratory system, as bronchitis, measles, whooping cough, and influenza. This form of pneumonia is very prevalent among children, particularly those living in towns, who are badly nourished or suffer from rickets, and it is the most common cause of death following measles. The onset in the primary form is usually abrupt, with a sudden rise of temperature and sometimes with convulsions. More frequently the child has suffered for some time from cough and bronchitis. Temperature rises from

102° to 104° F., the cough is distressing, breathing difficult, and the lips and fingers may be bluish. The pulse may be 150 to 200. In bad cases the child becomes restless, the breathing shallow, the cough ceases, and death from collapse occurs. In other cases the symptoms gradually ameliorate, and recovery occurs. Treatment consists in careful nursing, with attention to the diet and bowels. Cold sponging, or the application of cold compresses, may be adopted when the temperature is high.

Pneumonokoniosis (Gr. *pneumon*, lung; *koniein*, to make dusty). Disease of the lung due to inhalation of coal, steel, or stone dust, in industrial processes. The solid particles become deposited in the lymphatic glands of the lungs and bronchi. A mild degree of this condition is found in the lungs of all who have lived for any length of time in the sooty atmosphere of a large town. Chronic bronchitis and emphysema are common.

Pneumo-thorax. Presence of air in the thoracic cavity, i.e. between the lung and the chest wall. The condition may be due to rupture of the lung, so that air finds its way between the layers of the pleura (*q.v.*), or to an external injury perforating the wall of the chest and allowing ingress of air from the outside. Pneumo-thorax results in a certain degree of collapse of the lung, and often develops insidiously when associated with phthisis.

Pnom Penh. Capital of Cambodia, French Indo-China. It stands on the Mekong, 130 m. N.W. of Saigon. Under the French régime the city has been transformed by the construction of fine public buildings and spacious boulevards. The chief buildings are the palace of the Buddhist priests and the Pagoda. The city is a great centre of trade, especially for the district round the Great Lake to the N.W.: sea-going vessels can reach the riverside quays. Pop. 85,000.

Pnyx. Place of meeting of the ecclesia (*q.v.*) or general assembly of the people of ancient Athens. It was probably in the neighbourhood of the Acropolis and the Areopagus, but the exact identity of the place is doubtful.

P.O. Abbrev. for Post Office; Postal Order; Petty Officer.

Po (anc. *Padus*). River of Italy. It rises in the Cottian Alps (*q.v.*) by Mt. Viso, and flows in an E. direction through Piedmont, Lombardy, and Venetia to the Adriatic, which it enters by several mouths. About 415 m. in length, it is navigable for over three-quarters of its course. The drain-

age area is about 28,000 sq. m., and the chief tributaries are the two Doras, Sesia, Ticino, Adda, Oglio, Mincio, Tanaro, Trebbia, and Secchia.

The valley is an ancient arm of the Adriatic Sea, which has been gradually silted up with the off-scourings of the Alps and Apennines; the process continues even now, despite the regulating embankments and dikes, for the delta is growing steadily eastwards. In former times forested and marshy, it has been so altered by man that it is one of the most productive agricultural areas in Europe, the rice crop grown on the irrigated areas yielding 10 million cwt. annually.

Historically it has been one of the major cockpits of Europe. Numerous invading hordes swept into the N.E. across the low saddle of the Carso, conquerors, including Hannibal and Napoleon, entered the N.W. over the Alpine passes; it has been for long a battleground between Austria and Italy. This fact accounts for the importance to Italy of the Trentino (*q.v.*).

Poaching. Term used in English law for trespass upon another's land in pursuit of game or fish. The game laws of Great Britain, which may be traced back to the forest rights exercised by Saxon monarchs, are to-day a tangle of statutes of various dates. They rest upon the legal doctrine that wild animals are not the absolute property of anyone until they have been "reduced into possession" by killing or capture. Although, therefore, ownership or occupation of land gives exclusive right to take any game upon it, an infringement of that right is not larceny of the game, but a poaching offence.

The main provisions of the various Acts of Parliament directed against poaching may be summarised thus: Trespassing in pursuit of game by day, i.e. between an hour before sunrise and an hour after sunset, is punishable summarily by a fine of £2. This becomes £5 if the poachers refuse to leave, or give false addresses, or if the party exceeds four in number. The penalties for night poaching are three months' hard labour for a first offence, double that term for a second, and penal servitude, or two years' hard labour, for any subsequent offence. Persons found on highways by night for the same purpose incur a like punishment. If violence with any offensive weapon is offered, or if any member of a party of three or more night poachers is armed with such a

weapon, the offenders are liable to penal servitude. Persons suspected of poaching may be searched by a constable, and if any game or any instrument of poaching is found on them, they become liable to a fine, and the property may be forfeited.

Private fishery rights are protected by the Larceny and Malicious Damage Acts of 1861. People who unlawfully and knowingly fish in the daytime in waters where they have no right or permission to fish are liable to have their tackle confiscated by the owner of the fishery and to a fine of from £2 to £5. If the unlawful fishing is done by night, the offender can be arrested by anybody on sight, and taken before a magistrate for summary punishment. Any accessory to such fish poaching is liable to the same penalty. It is an indictable misdemeanour, if done in waters belonging to or adjoining a dwelling-house, and the penalty is a fine of £5, and forfeiture of the fish caught, if done in other private waters. The use of any explosive to kill fish is forbidden, and the use of lime or any noxious material in private fisheries for the same purpose is punishable with penal servitude.

Ireland has a distinct code of statutes against poachers, but this does not differ materially from the laws of Great Britain. The game laws of the mother country have not been applied to any of its over-sea possessions; but many of these have passed less stringent Acts for the protection of their wild animals. See Game Laws.

Pobiedonostzev, CONSTANTINE (1827-1907). Russian politician. Born at Moscow and educated at



the St. Petersburg school of law, he was appointed professor of civil law at Moscow in 1859, having been previously an official of the senate. He was tutor to Alexander III, became a member of the imperial council in 1872, and was appointed procurator of the Holy Synod in 1880. In this position he wielded great influence in ecclesiastical matters, but his stern opposition to nonconformity made him very unpopular. He resigned his position in 1905, after the war with Japan, and died March 23, 1907. Pobiedonostzev was the author of several legal works, a volume of essays, and a translation of the Imitation of Christ.

Pocahontas (c. 1595-1617). North American Indian princess, sometimes known as Matoaka. She



Pocahontas,
Indian princess

was a daughter of Powhattan, overking of the Indian tribes of Virginia. About the age of 12 she is said to have saved the life of Captain John Smith, who had been captured by the Indians, though the romantic story of her doing so has been called in question. In 1612 she was lured upon an English vessel and taken to Jamestown as hostage for the good behaviour of the Indian tribes. Converted to Christianity, she was baptized Rebecca, and in 1613 married John Rolfe (1585-1622), a leading Virginian settler. In 1616 she accompanied her husband to England, and in March, 1617, died at Gravesend, leaving one son. Her story has inspired several works of fiction. See Smith, John; consult also Pocahontas and her Companions, E. D. Neill, 1869; Pocahontas and her Descendants, W. Robertson, 1887.

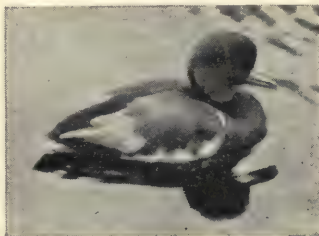
Pochard (*Nyroca ferina*). Diving duck of the sub-family *Anatidae*. An expert diver, the male has a reddish-brown head, black breast and back, and grey sides. The female has greyish-brown plumage. It is common as a migrant to Great Britain in the winter; but a few pairs are resident and breed in marshy places. The red-crested pochard is only a very occasional visitor. The bird is found over a wide range in Europe, Asia, and N. America. *Pron.* Pokard.

Pocket. Literally, a little pouch. It is used for the receptacles which are part of many articles of clothing, and for those at the sides of a billiard table. The compounds include pocket-book, pocket edition. In mining a pocket is a cavity filled with metalliferous ores. In the United Kingdom, a pocket borough was one of which the representation was controlled by a single man, or a small group of men, who could dictate to the electors how they should vote. Such were numerous before the Reform Act of 1832. See Mining; Ore Deposits.

Pocket-Gopher (*Geomys*). A family of rat-like rodents, which occur in North and Central America. The name is derived from their very large cheek pouches. They are about 8 ins. long without the tail, and the body is covered with soft velvet-like fur. They burrow like moles beneath the surface of

the ground and feed upon the roots of plants. Large chambers are constructed in which the animals collect great stores of potatoes, nuts, and seeds.

Pocklington. Market town and urban dist. of Yorkshire (E.R.), England. It is 13 m. from York, on the N.E. Rly. The chief buildings are the church of All Saints, mainly Early English, and the grammar school. The former contains several objects of interest, as well as a number of monuments. The latter was founded in 1515 by the Rev. John Dolman, and is now a large public school with scholarships and exhibitions. The industries are the making of farm implements and corn-milling, while horse, cattle, and sheep fairs are held. A canal connects the town with the Derwent. Market day, Sat. Pop. 2,600.



Pochard, a wild diving duck which visits Britain

Pocock, SIR GEORGE (1706-92). British admiral. Born March 6, 1706, he entered the navy in 1718 and saw much service in both the West and the East Indies. His place in history rests on his remarkable series of actions with the



Sir George Pocock,
British admiral

French Comte d'Aché in the East Indies, where Pocock was appointed commander-in-chief in 1757. The three actions of April 29 and Sept. 3, 1758, and Sept. 10, 1759, were fought mainly on strict line-of-battle conditions, but the last was fiercely contested, and the French never recovered their position. Pocock's last appointment, in command of the expedition to Havana in 1762, brought him £122,697 in prize money. He retired in 1766 and died April 3, 1792.



Pocklington, Yorkshire. Parish church of All Saints, from the north-east

Pococke, RICHARD (1704-65). British traveller. Born at Southampton, he graduated at Corpus Christi College, Oxford, and in 1734 was appointed vicar-general of Waterford and Lismore. Travelling in Greece, Egypt, Palestine, and Mesopotamia, 1733-42, on his return he published *A Description of the East and Some Other Countries*, 1743-45. He also made several journeys through England, Ireland, and Scotland as far as the Orkneys. In 1756 he became bishop of Ossory and in 1765 was translated to Meath. He died at Charleville, Ireland. His *Tours in Scotland*, 1747, 1750, 1760, were edited by D. W. Kemp, 1887.

Pod. Popular name for certain types of dry fruits, of which the legume and the silique are the chief. The legume, which is familiar in the pods of peas, beans, and furze, is characteristic of the entire natural order Leguminosae. It develops from a single carpel and opens by splitting along both edges. The silique has well-known examples in the seed-vessels of the wallflower, the cabbage, and all through the great order Cruciferae. The silique originates in two carpels, and when the seeds are ripe the two sides or valves split away from a central frame across which is spread the replum or partition which separates two layers of seeds. See Fruit; Manila Tamarind; Mezquit; Pea.

Podestà (Lat. *potestas*, power). Italian municipal officer. The podestà was originally appointed by the emperor and afterwards by the citizens, usually for a year. He was the supreme administrative and military official in the commune. The office was instituted in the 12th century, and lasted, though latterly shorn of much of its power, into the 16th century.

Podgoritza OR PODGORICA. Town of Montenegro. The largest place in the country, it lies about 19 m. N.E. of Cetinje. Before the Great War it had a considerable trade. Near it are the ruins of

Diocleia, birthplace of Diocletian. During the war Podgoritzta was occupied by the Austrians, Jan., 1916, and recovered by the Allies, Nov., 1918. Pop. about 14,000. See Montenegro, Conquest of.

Podiebrad, GEORG VON (1420-71). King of Bohemia. Born at Podiebrad, April 6, 1420, he gained



Georg von Podiebrad, king of Bohemia

a name in the Hussite wars against the Austrians, and brought about the election of Ladislav as king of Bohemia in 1453, himself acting as regent for the young king. On the death of Ladislav in 1457 he was elected, early in 1458, to succeed. His efforts to conciliate religious hatreds failed, and in 1466 he was excommunicated, and attacked by the Catholic nobles of Bohemia and Silesia and by Matthias, king of Hungary. Matthias was defeated and had to sue for peace, but Podiebrad died, March 22, 1471, before the treaty was concluded.

Podocarpus. Genus of evergreen coniferous trees of the natural order Taxaceae. They are chiefly natives of the extra-tropical regions of the S. Hemisphere, but with representatives in E. Asia and tropical America. They are closely related to the Yews (*Taxus*), which some of the species resemble in their two-ranked leaves and pulpy fruit. Several of the species afford valuable timber, as the Miro (*P. ferruginea*) of New Zealand, with close-grained reddish wood; the Totara pine (*P. totara*), also of New Zealand; and the Illawarra pine or Kidneywallum (*P. elata*) of Queensland and N. S. Wales, with light yellow durable wood, useful for piles, masts, and spars.

Podolia. Government of S.W. Russia. It is bounded N. by Volhynia, E. by Kiev, S. by Kherson, and W. by Galicia. The country is flat and fertile. The capital is Kamienets-Podolsk, and the chief rivers are the Dniester and the Bug. Sugar, tobacco, cloth, and spirits are manufactured. Area, 16,224 sq. m. Pop. 4,000,000.

Podophyllum (*P. peltatum*) OR MAY APPLE. Perennial herb of the natural order Berberidaceae, native of N. America. It has a creeping rootstock and thick fibrous roots. Barren stems end in a large round leaf with lobed margins, attached by the middle; flowering stems with two onesided, lobed leaves, and between



Podocarpus. Leaves and, inset, fruit of *P. ferruginea*

them a solitary, nodding, white flower, which is succeeded by a large yellow oval fruit with edible pulp, sweet and slightly acid. The leaves and stems are narcotic and poisonous. From the rootstocks, collected in autumn, the resinous extract known as podophyllin is obtained, and used as a cathartic medicine.

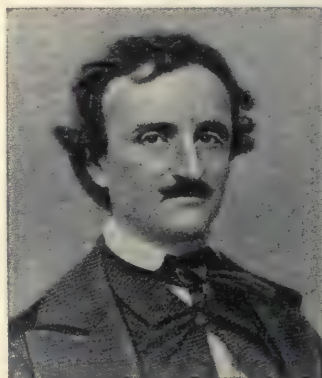
Poe, EDGAR ALLAN (1809-49). American poet, critic, and story writer. He was born at Boston, Massachusetts, Jan. 19, 1809, son of David Poe, an actor of Irish descent, who had abandoned law for the stage, and married an English actress, Elizabeth Arnold. At the age of three, having lost both parents, he was adopted by John Allan, a tobacco merchant of Virginia, who, when he went to London in 1815, sent the boy to the Manor School, Stoke Newington. On his return to Richmond in 1820, Poe went first to a private school there and to the new University of Virginia, where he matriculated, with distinction in classics and languages, in 1826, but contracted card debts, which Allan refused to pay. Removed to Allan's office, he enlisted in the U.S. army, became a serjeant-major, and in 1830 was entered as a cadet at West Point, from which he was dismissed in 1831 for insubordination. Henceforward he was left to his own resources and a life of



Podophyllum or May Apple. Leaves and flower; inset, fruit

drudgery, relieved by the devotion of his father's widowed sister, Mrs. Clemm, whose beautiful daughter, Virginia, he married in 1836, when she was not quite 14 years of age. Poe, who had begun to write verse before he was 15, published volumes of poems in 1827 and 1829, and in 1831 issued a third containing *The Sleeper*, *The City in the Sea*, *The Valley of Unrest*, *Lenore*, and *Israfel*. His first work as a story writer, *A MS. Found in a Bottle*, won a prize offered in 1833 by *The Baltimore Saturday Visitor*. His realistic romance of the sea, *The Narrative of Arthur Gordon Pym*, appeared in 1838; *Tales of the Grotesque and Arabesque* in 1840.

In the *Southern Literary Messenger* of Richmond, and other periodicals, he achieved recognition as a critic, being, perhaps, the first in America to place literary criticism on a rational basis, and was among the first to appreciate E. B. Browning, Tennyson, Dickens, Hawthorne, Lowell, and others.



Edgar A. Poe

With the *Adventures of one Hans Pfaal* and *The Balloon Hoax*, he anticipated Jules Verne, as in *The Gold Bug*, *The Murders of the Rue Morgue*, *The Mystery of Marie Roget*, and *The Purloined Letter*, he may be said to have founded the modern detective story; while his William Wilson might have suggested Stevenson's *Dr. Jekyll* and *Mr. Hyde*. Of his tales of fantasy the most remarkable is *The Fall of the House of Usher*; with it may be noted *The Pit* and *The Pendulum*, *The Cask of Amontillado*, and *The Assignment*.

Fame came tardily to Poe with the publication in 1845 of *The Raven*. He was then on the brink of tragedy. In their little cottage at Fordham, near New York, his child-wife died, Jan. 30, 1847,

in surroundings marked by every sign of penury except dirt.

Save for The Bells, Ulalume, For Annie, and Annabel Lee, the last named written in memory of his dead wife, Poe's life-work was virtually finished. The remaining years, still the subject of controversy, were years of tragedy. Poe died of brain fever in hospital at Baltimore, Oct. 7, 1849, and was buried in the old cemetery of Westminster Church.

Poe was usually a solitary, where the world was concerned, with gentlemanly bearing, but of a temper that stood in the way of those who tried to help him. He was devoted as a husband, but unable to withstand the poison of drink or the temptation of opium. Greater as craftsman, perhaps, than as artist, his work, in its kind, is original and perfect. His poetry is masterly in form and in music, his tales are flawless in technique. His influence has been world-wide, especially in France; himself he was influenced by Shelley, Byron, Coleridge, and E. B. Browning. His last words were "Lord, help my poor soul."

W. F. Aitken

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Poel, WILLIAM (b. 1852). British actor-manager. Making his first appearance in 1876, he was the first



William Poel, British actor-manager
Russell

modern producer to revive Hamlet without scenery, at St. George's Hall, London, 1881. He managed the Old Vic., 1881-83, and became stage manager for F. R. Benson, 1883-84.

In 1895 he founded the Elizabethan Stage Society, reviving plays by Marlowe, Ben Jonson, Beaumont and Fletcher, etc. The first to point out that, in characterisation and in the delivery of verse, modern actors adopt the traditions of the 18th century as distinct from those of the Elizabethan open platform period, he dramatised Baring-Gould's *Mehalah*, 1886, and wrote *Shakespeare and the Theatre*, 1913.

Poelcapelle. Village of Belgium, in the prov. of W. Flanders. It lies one mile E. of Langemarck (q.v.), and was prominent in the British operations in the Ypres salient in the Great War. Occupying a commanding position on a ridge, it was fiercely contested in the first battle of Ypres. Here in April, 1915, the Canadians put up a great defence when the Germans attacked the salient. It was stormed by the British 11th division, Oct. 4, 1917, marking the N.E. limit of their advance in the third battle of Ypres. Retaken by the Germans in April, 1918, it was captured by the Allies in Sept. A British war memorial is projected on its site. See Ypres, Battles of.

Poerio, CARLO (1803-67). Italian patriot. Born at Naples, Dec. 10, 1803, he supported every popular agitation for constitutional government, and was in exile, 1821-35. In 1835 he went back to Naples, and practised law until the rising of 1848, when the threat of revolution caused Ferdinand to appoint him to the cabinet. The collapse of the national cause in 1849 gave the king an opportunity of wreaking his vengeance, and Poerio was sentenced to 19 years in the galleys. Gladstone's exposure of the Bourbon atrocities, and his special reference to Poerio, had the tardy effect of releasing him in 1858, and he was elected to the Italian parliament of 1860. He died April 28, 1867. His brother Alessandro (1802-48), an eminent poet, shared his fortunes until he was killed at the siege of Venice, Nov. 3, 1848.

Poet at the Breakfast Table, THE. Third volume of Oliver Wendell Holmes's breakfast table series,

published in 1872. Though less spontaneous than *The Autocrat*, it is full of humour and mellow wisdom. It is interspersed with poems.

Poet Laureate. A poet crowned with bays or wreath of laurel. The custom originated in Greece, and was perpetuated in Rome, where Domitian gave the bays to Statius. Petrarch was similarly honoured in Rome in 1341. The custom was followed in Germany in the 15th and 16th centuries, and in 16th century Spain.

In England the title poet laureate was first applied to a poet attached to the court; known earlier as *Versificator Regis*, he was styled poet laureate in the time of Edward IV, the first holder being John Kaye, author of *The Siege of Rhodes*, a work printed by Caxton. John Skelton called himself both poet laureate and regius orator; he was crowned at Oxford and wore the laurel at Cambridge. Though Chaucer was a recipient of gifts from Edward III and Richard II, and Spenser was pensioned by Elizabeth, the English laureateship is usually dated from Ben Jonson, to whom James I, by letters patent, gave a pension of 100 marks (about £67), a sum increased by Charles I to £100 and a tierce of canary wine. In Southey's time the sum of £27 was substituted for the wine. The more notable holders of the office have included Dryden, Southey, Wordsworth, Tennyson, and Robert Bridges. With the exception of Nahum Tate (1652-1715), all have been born in England. See *The Laureates of England*, K. West, 1895; *The Poets Laureate of England*, W. F. Gray, 1914.

POETRY: ITS MUSIC AND MEANING

W. Macneller Dixon, M.A., Professor of English Language and Literature, Glasgow

See the biographical articles on the world's great poets, Dante; Homer; Milton; Shakespeare; Shelley; Virgil, and others; Prose; Rhythm; Verse; also *English Literature*

Poetry eludes definition and necessarily eludes it. The word is a convenient and comprehensive term, invented by the Greeks, to which successive races, generations, and individuals have attached each their own meaning. It has been employed to describe compositions to all seeming poles apart. Treatises on agriculture and gardening, on theology and astronomy, on the art of criticism and of cookery, works as remote from each other as Armstrong's *Art of Preserving Health* and Shelley's *Skylark*, even works in prose like the *Dialogues of Plato*, have, in a spirit of magnificent inclusiveness, been described as poetry. Is it possible to discover the underlying connexion, the link

which binds together compositions apparently so diverse, which in some fashion or other unites them all, and thus to explain to ourselves what we really mean when we speak of poets or poetry?

Certainly some connexion exists. Yet to the question, where precisely is it to be found, the answers have been many and various. In the main, however, they are divisible into two classes. One is the answer which, like Arnold's, speaks of it as "a criticism of life," or "the noble and profound application of ideas to life," and thus emphasises its substance or content. The other belongs to the class which, like Hegel's dictum, "Metre is the first and only condition absolutely

demanded by poetry," emphasises its form. This is to say that by some critics poetry has been regarded as a certain way of looking at things, by others as a certain way of expressing things. The truth seems to be that it is both. Avoiding pedantry we may say that what is common to poets is a similarity in their way of viewing human experience, the emotional and imaginative way, together with a similarity in their way of presenting it, the rhythmical way. "It is not metres, but a metre-forging argument that makes a poem, a thought so passionate and alive that, like the spirit of a plant or animal, it has an architecture of its own, and adorns nature with a new thing." (Emerson.)

What then is the connexion between the emotional and imaginative way of viewing experience and the metrical way of presenting it? The idea, in passing through an emotional medium, or mood of feeling, clothes itself in images and rhythm. Thought, when impassioned or aglow, seeks an outlet in language attuned to it. Just as the emotion felt by the orator tends to raise the key of his utterance, to produce the excited or heightened speech called eloquence, so the poet's emotion clothes itself in imaginative and rhythmical speech. The language not only expresses his thought, it echoes the feeling which accompanies his thought. It tends also to produce the same mood in the reader or hearer, to arouse a corresponding emotion, a contagious excitement, not unlike that which impels one to beat time to music in which the rhythm is strongly marked. "You may speak truth uncontradicted in verse, you cannot in prose."

Words and Ideas

By entangling, that is, the mind of the reader in the tune, by awaking what is at least a partial and sympathetic response to the rhythm, the poet finds the reader entry for his point of view or his ideas. "We are all sensible," says Reynolds, "how differently the imagination is affected by the same sentiment expressed in different words." There are many ways of saying much the same thing, but that a peculiar and striking effectiveness attaches to the imaginative and rhythmical way of the poets, all races and generations have borne witness. This effectiveness may arise from a happy choice of words, a turn of phrase, a suggestive metaphor, an arresting idea, a subtle reference or profound reflexion, but is essentially poetical only when it is accompanied by an engaging or captivating rhythm.

In the last analysis, however, one cannot separate form from substance in poetry, any more than in sculpture or music; the poem itself is the link that holds them together in an indissoluble union. Alter the expression or the tune, and inevitably you have in some measure altered the idea; the impression conveyed is not the same. Nor is there any word in any language which can exactly replace another word. Each has at least its own sound and association values. It is not, therefore, really possible to say exactly the same thing in different words. The slightest disturbance in the form involves a change in the substance, and this is more particularly true of poetry; we have not only "the best words," but "the best words in the best order." In poetry, as in music, the matter is in the poem. Nevertheless, there are many types. In Browning, for example, the intellectual element is emphasised; in Swinburne the musical. On the one side poetry may fall away so as to be barely distinguishable from prose; on the other, so as to be little more than verbal music.

The Ear and the Understanding

It is the peculiarity of this art that in it we have sounds addressed at one and the same moment to the ear and to the understanding, and in its highest reaches music and thought are so interwoven that the effect cannot be assigned exclusively to the one or the other, to the quality either of the form or of the substance. It is the combination that delights us. "One loves to feel the idea bending and adjusting itself to the rules of verse, and the verse yielding to the demands of the idea." Poetry is the sum of two values, the intellectual and the musical, but somehow the effect is greater than their sum. Rhythm and metre, which is "the application of rhythm to speech," symbolise our entry into a new, unconventional world, where beauty is desired for its own sake, where human experience is brought into relation with the ideas of the heart, where truth and justice are invincible and the imagination free to build its own house, with its own materials, unfettered by practical considerations.

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Pogo. Exercise which became popular in 1921. The pogo jumping-stick is a pole short or long according to the height of the user, with



Pogo. The jumping-stick in use

foot rests on either side. At its base is an indiarubber pad, and in the interior of the stick is a strong coiled spring. The mechanism is simple, but makes hopping an excellent exercise, the shock being broken by the indiarubber pad. The kangaroo-like attitude of the players causes some amusement

at first, but enthusiasts claim a great future for pogo.

Pogrom (Russian, devastation). Deliberate massacre in Russia aimed at the destruction of a particular class, and especially applied to organized attacks upon Jews. The term was frequently found in English newspapers from 1880 onwards. *Pron.* Pog-gromm.

Pohl, HUGO. VON (1855-1916). German sailor. Born at Breslau, Aug. 25, 1855, he entered the German navy, attaining the rank of captain in 1900; was on active service in China, 1900-1; and promoted vice-admiral in 1909. Chief of the German Admiralty staff in 1915, he became commander-in-chief of the High Seas Fleet in succession to Ingenohl in April, 1915, retaining this position till Jan., 1916, when he retired. He died in Feb., 1916. His notes and letters, which deal, among other matters, with the early phases of the U-boat war, were published in 1920.



Hugo von Pohl, German sailor

Poilu (Fr., hairy or bearded). Popular name given to the French soldier. It was first used for the recruits as distinct from the older men and implied affectionate respect, not devoid of humour. Later the word came to signify the common soldier of France, particularly under the conditions of trench warfare.

Poincaré, JULES HENRI (1854-1912). French scientist. Born at Nancy, April 29, 1854, he became an engineer, 1879. In 1886 he was

appointed professor of mathematical physics in the Faculty of Sciences, Paris, and in 1896 he became professor of celestial mechanics. He died July 17, 1912.



J. H. Poincaré,
French scientist

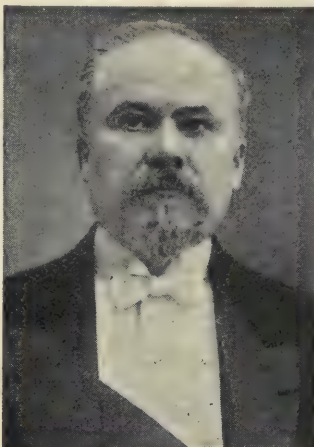
Poincaré was one of the most brilliant mathematicians of the 19th century, not only carrying out a series of remarkable investigations into the problem of three bodies, and the theory of functions, in which he introduced an entirely new mathematical weapon, but also investigating the theory of non-Euclidean geometry, the higher algebraic functions, etc. He was honoured by many societies for his work, receiving the gold medal of the Royal Astronomical Society, the Sylvester medal of the Royal Society, the gold medal of the French Association for the Advancement of Science, etc. He wrote many books, the chief of which are *Leçons sur la théorie mathématique de la lumière*, 2 vols., 1889-92; *Électricité et optique*, 2 vols., 1890-91; *Les méthodes nouvelles de la mécanique céleste*, 3 vols., 1892-99; *Calcul des probabilités*, 1896; *Cours de physique*, 13 vols., 1890, in addition to contributing many scientific and mathematical papers. See Problem.

Poincaré, RAYMOND NICOLAS LANDRY (b. 1860). French statesman. Born Aug. 20, 1860, at Bar-le-Duc, he was educated at Nancy and Paris, and called to the Paris bar. For some time he contributed law court reports to *Le Voltaire*. In 1886, while secretary to the minister of agriculture, he was elected councillor-general for Pierrefitte-sur-Aire, and in 1887, deputy for the Commerce division of the Meuse department. He was re-elected time after time until 1903, when he became senator for the Meuse, encountering no opposition in 1893 and 1898, and defeating a nationalist coalition in 1902.

¶ In 1890 Poincaré was elected a member of the Budget committee, becoming its chairman in 1892. In 1893 he was appointed minister of finance in the first Dupuy cabinet, and in the second Dupuy cabinet (May, 1894-Jan., 1895), his term of office being characterised by a policy of rigid economy. When the Dupuy cabinet fell, he remained in the ensuing Ribot cabinet as minister of public instruction and in that capacity frequently debated in the assembly with Jean Jaurès (*q.v.*).

During this period Poincaré delivered many speeches which made his name popular among the public, and prepared the bill on university reform, which became law in Jan., 1896. On leaving office he was chosen as vice-president of the chamber, Nov., 1895, being re-elected during the two following years. During the same period he resumed his legal practice. After his election to the senate he became president of its Budget committee. In March, 1906, he was minister of finance under Sarrien.

On the fall of the Caillaux (*q.v.*) cabinet in Jan., 1912, Poincaré became prime minister and, with



Raymond Poincaré, French statesman

the premiership, took the ministry of foreign affairs. He was still premier when elected president of the Republic on Jan. 17, 1913, his chief opponent being Jules Pams, and his elevation to the highest office was undoubtedly due to the qualities he manifested as premier. In his inaugural message to parliament he dwelt on the urgency of social reforms and the necessity of strengthening the army and navy. Shortly afterwards the law ordaining three years' military service was passed. In June, 1913, he visited King George, the purpose of his journey to England being to consolidate the Franco-British entente. Returning hastily from a visit to Russia with René Viviani, the premier, when the war-clouds were thickening, Poincaré, on Aug. 1, 1914, issued his proclamation to the French nation, countersigned by all the cabinet ministers, dwelling on the gravity of the international situation and emphasising the fact that France had always affirmed her pacific intentions. During the course of the Great War he frequently visited the front.

Poincaré retired from the presidency in Jan., 1920, being succeeded by Paul Deschanel (*q.v.*). He was re-elected senator for the Meuse, and was president of the reparations commission for a short time, but resigned in May, 1920, owing to lack of sympathy with the general Allied policy on that question. In Feb., 1921, he was elected president of the foreign affairs commission of the senate. In that capacity and as foreign editor of *La Revue des Deux Mondes*, to which post he was appointed on retiring from the presidency of the Republic, Poincaré stood for a strongly nationalist policy. He was again premier and minister for foreign affairs 1922-1924. Poincaré became a member of the French Academy in 1909, his principal literary works consisting of his speeches, *e.g.* *Messages, Discours, Allocutions, Lettres et Télégrammes*, 2 vols., 1920. See Casket; consult also Raymond Poincaré, H. Girard, 1913.

John Parslow

Poinding (A.S. *pyndan*, to pound). In Scots law, the taking of goods in execution or by way of distress. It is either real, called poiding of the ground, meaning removal of effects on the land for payment of a debt attaching to the land, *debitum fundi*; or personal, seizure of movables for rent or debt. The word is also applied to the impounding of stray cattle.

Poinsettia (*Euphorbia pulcherrima*). Shrub of the natural order Euphorbiaceae, native of Mexico. It has oval-elliptical leaves and small greenish-yellow flowers. There are a number of large leaf-like bracts around the flowers, coloured a brilliant vermillion.

Point. Word used in a number of senses. It is the tapering end of any object, *e.g.* needle, pencil, knife, and often merely the end, *e.g.* the point of the nose. A stone-cutter's tool used for smoothing down rough surfaces is called a point. In heraldry, it is a pile-shaped charge, usually in the base of a shield, formerly used as an abatement. In railways, points are the tapering ends of rails.

The full stop in printing is called a point or period. In geometry, a point is defined as that which has position but no magnitude. In games, points are units of scoring, *e.g.* at billiards, cribbage; in stock exchange quotations they are units in price quotations of shares; in cricket and certain other games point is the name given to a player who stands in a certain position on the field of play. In hunting, point to point means

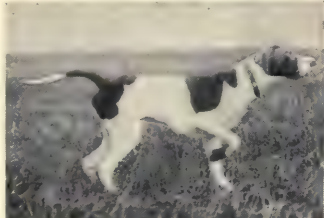
straight across country. The word is also used in the sense of an important feature, outlook, etc., e.g. point of honour.

Point. In music, a dot employed in medieval notation and placed either after a note or above the staff, in order to affect the value of certain notes. The principal dots were known as points of (a) augmentation; (b) perfection; (c) alteration; (d) division. Point was also an old term for a note.

Pointe à Pitre. Town of Guadeloupe, French West Indies. The chief commercial centre of the colony, it has a good harbour with a trade in sugar, vanilla, and cacao. The town was almost destroyed by an earthquake in 1843, and by fire in 1871. Pop. 19,000.

Pointer. Old breed of sporting dog of Spanish origin, which in its British type has been crossed with the foxhound and the greyhound. It is characterised by the habit of pointing, or stopping dead and remaining rigid when it finds game at close quarters.

The pointer, which belongs to the hound group, hunts by scent, but follows the body-scent, not the foot-scent, of the game, wherefore it should carry its head high when working, and not low as the foxhound does. A large specimen stands about 24 ins. high at the shoulder and weighs nearly 60 lb.

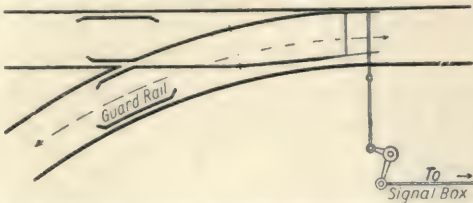


Pointer. Prize-winning specimen of the breed of sporting dogs

In general appearance it is not unlike a foxhound, but is always parti-coloured, liver and white being the favourite combination. See Dog, colour plate; Kennel.

Pointillism. In painting, the representation of vibrating light and atmosphere by means of pure colours laid on in juxtaposed points or dots. This technique was an offshoot of the Impressionist doctrine of the division of tones, and was adopted by Camille Pissarro (*q.v.*) and others. See Neo-Impressionism.

Pointing. In music, the method of marking the prose Psalms so as to ensure correct accentuation and unanimity in singing them to the Anglican chant. At one time the rendering seems to have been empirical, and was probably not unsatisfactory with singers con-



Points. Crossings and points at York station, England. A. Single junction. B. Diamond crossing. C. Single slip. D. Double slip. E. Cross-over road. F. Scissors crossing. G. Special scissors crossing. Top, diagram showing disposition of rails for a single junction

stantly rehearsing together, but when it became more general to chant the prose Psalms in place of the metrical versions, it was necessary to devise some way more useful to the average choir. Many attempts were made, but the method now in vogue is based upon the application to the words of the bar-lines in the music, so that in the mediation and the cadence, the syllables may coincide with the notes, all redundant syllables being sung to the reciting note.

Point Lace. Light embroidery employing a foundation usually of hexagonal net, and hand-worked with the point of a needle, whence its name. Seen under a magnifying-glass the more solid portions of the design are found to consist of looped (not of twisted or plaited) threads. By old custom certain patterns of pillow lace (*q.v.*) are also, though incorrectly, called point, Bucks point and point d'Angleterre, for example. See Lace and colour plate.

Points. Device by means of which a railway track branches into two or three separate tracks, or by which a train is enabled to pass from one track to another, also known as switches and turnouts. At a given point in the track the two outer rails are laid so as to diverge, one or both of the rails being curved outwards for the purpose. From the same point, in the case of a single turnout, an additional rail tapering to a knife-edge and known as a tongue rail is laid on the inside of each of the main rails, one being arranged tangentially to one outer rail and the other tangentially to the other outer rail, so that these tongue rails converge to a crossing point; they are rigidly cross-connected by bars or rods, and rest upon metal plates called chairs.

Two tongue rails with their connexions are known

as a switch and are connected by rodding to switch levers in a signal cabin or at the side of the track, by means of which the knife-edge of one may be drawn tightly against the inner edge of one of the outer rails, leaving a space between the other knife-edge and the other outer rail or vice versa. By this means the knife-edge guides the wheel flanges of railway vehicles on to one of the tracks, the space on the opposite side allowing the opposite wheel flanges to pass. At the point where the tongue rails, continued as ordinary rails, would otherwise cross, their ends are splayed apart, and the pointed end of two other rails spliced together is inserted between them, leaving a clear space for wheel flanges.

The spliced rails in turn diverge and, continued, form the two extra rails required for two separate tracks. The pointed end of the spliced rails is called a frog, and, with the splayed ends, constitutes what is known as the crossing.

On either side of the crossing, on the inner edges of the two outer rails, a short length of guard rail is fixed, to prevent the flanges from fouling and mounting the frog. In cases where the track branches into three it is termed a three-throw switch; the arrangement is more complicated as additional tongue rails are introduced. When a frog points in the direction from which trains approach, the switch is a facing switch; when in the opposite direction, a trailing switch.

The curvature of rails at a turnout is determined by the angle of crossing, i.e. the angle at which the switch-rails would cross, measured on the gauge line, if not splayed at their ends. The greater the angle the sharper the curvature; both are determined by the gauge of the railway, the speed at which trains have to be diverted, and other considerations. See Railways.

Point to Point. Name given to a type of race for hunters. They are held under the auspices of a hunt, and are usually divided into two classes: for welter-weights, over 13 stone, and for light-weights under that figure. Usual conditions are that the horses entering must have been regularly hunted, and must be ridden by their owners. The course is generally one of three or four miles, over a fair hunting country. See Steeplechasing.

Poiré, EMMANUEL. Real name of the French caricaturist better known by his pseudonym of Caran d'Ache (q.v.).

Poison (Lat. *potio*, draught). Substance which, when taken into the mouth or stomach or absorbed by the blood, is capable of seriously affecting health or destroying life. Some poisons have a local action only, as the strong mineral acids which injure the tissues with which they come directly in contact. When well diluted they are not poisons. Other poisons, e.g. morphia, have no local action, and only produce symptoms after having been absorbed into the system.

A poison which is inhaled in the form of a gas, or is injected hypodermically straight into the blood stream, acts with great rapidity. When swallowed, absorption is much less rapid, and as the process of elimination acts concurrently, an amount taken by the mouth may be less dangerous than a smaller amount injected subcutaneously. Poisons may also be absorbed through the skin. Some poisons, as alcohol, morphia, and cocaine, when taken for a long period, gradually confer on the taker a degree of tolerance which enables him to swallow quantities which would normally be fatal.

In the treatment of poisoning, the first object aimed at is removal of the poison from the system. Vomiting may be produced by tickling the back of the throat with a feather, or by the administration of an emetic, as a tablespoonful of mustard, or one or two tablespoonfuls of salt in a tumbler of warm water. This form of treatment may be employed in all cases of poisoning, except those due to the strong mineral acids or to strong alkalis, in which straining the damaged or corroded tissues may lead to perforation of the stomach. The treatment for strong acid poisoning is to administer an alkali, calcined magnesias being the best; but in an emergency sodium bicarbonate, chalk, or even plaster from the ceiling may be given, and, failing these, the poison should be diluted by administering large draughts of water.

In poisoning by caustic potash or other alkalis, water with vinegar or lemon-juice should be given to neutralise the acid. Another method of removing poison is by means of the stomach-tube. A long, flexible indiarubber tube is passed by the physician into the stomach, and the tube and stomach are then filled with water through a glass funnel. By lowering the funnel, the fluid is drawn off from the stomach by syphonage. Thus the stomach can be washed out as frequently as necessary, and antidotes introduced. With such poisons as fungi, in which the onset of the symptoms is delayed for several hours, much of the poison is apt to have passed on from the stomach into the intestines, and in these cases administration of a brisk purge assists elimination.

Use of Antidotes

Antidotes to poisons act in various ways. The object in some cases is to convert the poison into an insoluble substance. Thus, in oxalic acid poisoning, soluble calcium salts are given to precipitate the insoluble calcium oxalate. In poisoning by metallic salts, such as the corrosive sublimate or mercuric chloride, albuminous substances such as white of egg are useful, as they convert the poison into albuminates, which are much less soluble. These, however, are slowly digested, so that it is still necessary that they should be removed from the system by emesis or washing out. Other antidotes act as physiological antagonists, i.e. they produce the opposite effect of the poison. With signs of heart failure, ether, strychnine, or caffeine may be administered. Respiratory failure may need treat-

ment by artificial respiration. Prolonged vomiting and severe pain may justify the use of morphia.

Poisoning by vegetable food, with the exception of fungi, is rare, occurring almost exclusively as a result of accidental contamination of the food, as, for example, when lead is dissolved out of the vessel containing preserved fruit by the action of the fruit juices.

MEAT. Poisoning by meat is nearly always the result of acute infection by bacteria, following the eating of diseased or putrefying meat. Usually, the animal from which the meat has been prepared has been found to be suffering from infection with the *Bacillus enteritidis* of Gärtner, an organism which belongs to the paratyphoid group. The disease has been found in cows after septic poisoning following calving. Less frequently, it has occurred in sheep and pigs.

Botulism is a rare form of poisoning due to the presence of a micro-organism, which has been found in infected meat that has been potted, or otherwise preserved so as to exclude air.

Symptoms of Meat Poisoning

The symptoms of poisoning from meat usually begin from 6 to 12 hours after the food has been eaten. Sometimes there is a delay of from 12 to 48 hours. They may begin suddenly with acute onset, or more gradually with nausea, loss of appetite, and feelings of ill-health. The most marked symptoms are vomiting, pain, or colic in the abdomen, headache, profuse diarrhoea, pain in the back, and rise of temperature. Rashes on the skin sometimes occur, and, in severe cases, delirium. The great majority of cases recover, but in severe cases there may be failure of the action of the heart, collapse, and death. When the symptoms begin early, some relief may be obtained by inducing the patient to vomit; but usually the food has passed on from the stomach before the condition is recognized.

Any decomposing fish may give rise to poisoning. Mackerel is especially liable to become rapidly unfit for food. Crabs, lobsters, and other shellfish are equally dangerous if not fresh. Oysters and mussels, if they have grown in sewage-polluted waters, may convey typhoid. The symptoms are those of irritation of the stomach and intestines. Milk may be responsible for epidemic poisoning, if infected by organisms. It may also convey diphtheria and other bacterial diseases.

The Pharmacy Acts impose certain restrictions on the sale of poisons. The poisons to which the

regulations apply are placed in two groups in what is known as the poisons schedule. When a poison in either group is sold, either wholesale or retail, the box, bottle, vessel, wrapper, or cover in which the poison is contained must be distinctly labelled with the name of the article, the word "poison," and also the name and address of the seller.

No poison in part 1 of the schedule may be sold to any person unknown to the seller, unless introduced by some person known to the seller, and upon every such sale the seller must, before delivery, make, or cause to be made, an entry in a book kept for that purpose, the date of the sale, name and address of the purchaser, name and quality of the article sold, and the purpose for which it is stated by the purchaser to be required. To this entry he must obtain the signatures of the purchaser and the person, if any, who introduced him. Arsenic is the subject of additional special regulations. The most important poisons in part 1 of the schedule are arsenic, atropine and belladonna, corrosive sublimate, cyanide of potassium, prussic acid, nux vomica, strychnine, and veronal; in part 2, carbolic acid (except preparations for use as sheep wash or other purposes connected with agriculture under certain regulations), chloroform, and oxalic acid. See Food.

Poison Gas. Term used to designate the various noxious chemicals employed to incapacitate troops in warfare. The chemical may either be discharged as a cloud, or filled into bombs or shell, the contents, generally in liquid form, being distributed by a small charge of explosive. The first recorded use of poison gas in civilized warfare was the use of chlorine by the Germans in April, 1915. This was discharged against the allied trenches as a cloud of gas, being stored under pressure in cylinders in the German trenches, the wind carrying the cloud along. Phosgene was also employed by the Germans in clouds, and as a shell charge. It was used, too, by the Allies for the latter purpose and in trench howitzer bombs. Unlike chlorine its action is not corrosive, but a comparatively low concentration results in speedy death owing to its toxic properties. When phosgene is used, the proportion of fatal casualties is generally high, as the majority of men who are at all affected inhale the small amount necessary to cause death. Hydrocyanic, or prussic acid, has also been employed in shells and bombs.

Another poison which the Germans used in shell to a very considerable extent was trichloromethyl-chloroformate, $\text{Cl}\cdot\text{COOC}\cdot\text{Cl}_2$, also known as superpalite and diphosgene. It has similar toxicological properties to phosgene. Another chemical with similar properties employed in the same way was chloromethylchloroformate, $\text{Cl}\cdot\text{COOCH}_2\cdot\text{Cl}$.

In another section of organic chemistry poisons have been found for this purpose, namely the arsenical compounds of which diphenyl-chloro-arsine has been most extensively employed. It is a yellow, faintly odorous oil, boiling at 333°C , and does not fume in air. It is intensely poisonous, causes violent sneezing, and has an irritant action on the skin. Dichloromethyl-ether, $(\text{CH}_3\text{Cl})_2\text{O}$, has also been used in shell, whilst allyl-isothiocyanate ($\text{C}_3\text{H}_5\text{NCS}$), which also possesses lachrymatory properties, has been used, as well as phenylcarbylamine-chloride ($\text{C}_6\text{H}_5\text{NCCl}_2$), a poisonous and lachrymatory chemical with a most evil odour. Various chemicals have been used in hand grenades, including bromine, which is almost identical in properties with chlorine and sulphur trioxide.

Chlorosulphonic acid, SO_3HCl , was to a certain extent used in smoke pots, where the poisonous nature of the attack was apt to be mistaken for a smoke screen. One of the most successful compounds used in chemical warfare was dichlorodiethyl sulphide, also called mustard gas, while various compounds specially employed to cause weeping or sneezing were called accordingly weeping and sneezing gas. See Chemical Shell; Gas; Gas Helmet; Gas Shell; Mustard Gas; Sneezing Gas; Tear Shell; consult also The Riddle of the Rhine, Victor Lefebure, 1921.

Poison Ivy (*Rhus toxicodendron*) or POISON OAK. Bushy shrub of the natural order Anacardiaceae.

It is a native of N. America, where it is abundant in woods, thickets, and hedgerows, often climbing to considerable heights by means of rootlets, after the manner of ivy. The leaves are divided into three oval or rhombic leaflets, paler and downy beneath. It has minute, whitish flowers in panicles, succeeded by small cream-coloured berries. The whole plant is highly poisonous, and many persons are so susceptible to its influence that even brushing the plant with the dress may cause serious trouble. Poison elder (*Rh. vernix*), which has from 7 to 13 leaflets, is a more erect shrub and also very poisonous. See Sumac; consult also Science from an Easy Chair, First Series, E. Ray Lankester, new ed. 1916.

Poissy. Town of France. In the dept. of Seine-et-Oise, it is 17 m. by rly. N.W. of Paris. It stands on the left bank of the Seine on the edge of the forest of St. Germain. The church of Notre Dame is a fine example of the Transition style. There are iron and steel works. Here, in 1561, was held the abortive conference between the Roman Catholics and Protestants known as the Colloquy of Poissy. Pop. 8,700.

Poitiers. City of France. The capital of the dept. of Vienne, it stands on a hill near where the



Poitiers arms

rivers Clain and Boivre unite. It is 61 m. from Tours. The city is famous for its historic buildings and associations. The former include the cathedral of S. Pierre, mainly Gothic, begun in the 12th century, and containing architectural and other features of interest. S. John's Church is said to be the oldest Christian building in France; it dates from the 4th century, when it was built as a baptistery. S.

Hilary's, which holds the relics of S. Hilary, is a large building restored in the 19th century. Other churches are S. Radegonde's, much visited by pilgrims, and Notre Dame la Grande, both of the 11th and 12th centuries. The old tower of S. Porchaire was restored in the 19th century. There is a modern town hall



Poitiers, France. West front of the cathedral of S. Pierre

and an old one; the former, on the Place d'Armes, is in the French Renaissance style and was finished in 1876. In it is a museum and picture gallery, and the city has other museums. The palais de justice embodies some parts of the castle of the counts of Poitou. Its finest apartment is the guard-room built early in the 15th century by the duke of Berry. The university, founded in 1432, occupies the building originally the Hôtel Dieu; it has a valuable library. The Hotel Berthelot is one of several fine old houses. The Lycée was once a Jesuit college. The Pont Neuf is an 18th century bridge; the Pont Joubert dates in part from the 12th. There is a botanic garden, and the Parc de Blossac is a public recreation ground. The Roman remains include those of an amphitheatre and baths. Poitiers has some manufactures and a trade in agricultural produce. It has a service of steam and electric tramways.

Poitiers is named after the Gallic tribe of the Pictones. It was a Roman station and afterwards a stronghold of the Visigoths before passing to the Franks about 500. The bishopric was founded by S. Hilary about 350. It was the residence of the counts of Poitou and their successors the dukes of Aquitaine, and as such came to the heiress of the duke, Eleanor, the wife of the English king, Henry II, who gave municipal rights to the inhabitants. In 1432 Charles VII was crowned here. Pop. 41,000.

Several battles have been fought near Poitiers. In 507 the Visigoths were defeated near here by the Frankish king, Clovis. The great battle of Oct., 732, between the invading host of Mahomedans and a Christian army under Charles Martel is sometimes called the battle of Poitiers. Resulting in the rout of the invaders, it put a definite stop to the advance of the Moslems into western Europe. See Poitou.

Poitiers, BATTLE OF. English victory over the French during the Hundred Years' War, Sept. 19, 1356. Edward, the Black Prince, in command of some 8,000 men, was marching up from Guienne, where he had landed the previous year, when, near Poitiers, he found his way barred by a French army of 15,000 under King John. Attempts at peace having failed, the battle opened with a French attack made with the dismounted knights of one of the four divisions into which the army was divided. The English archers, skilfully placed behind hedges, met them with a flight of

arrows, and they failed utterly. The next assault made more impression, but these knights, too, had to give way after a stout exchange of blows. The third division thereupon fled from the field, but the fourth, under the king himself, advanced, and the English were hard pressed. The Black Prince, however, sent a small body to the rear of this force, and this move decided the day. The French knights fought to the last, but by night the army was routed. John, his son Philip, and some 2,000 knights were made prisoners, while about 3,000 were killed. The English losses were slight, but no certain figures are known.

The actual site of the battle is said to be some six m. S.E. of Poitiers, at a place called Maupertuis. It is described by the English chronicler, Geoffrey le Baker, and by Froissart. See Art of War in the Middle Ages, C. Oman, 1898.

Poitou. Prov. of France before the Revolution. It lay between the Loire and the Garonne, around Poitiers, its capital. From the 9th century it was ruled by the counts of Poitiers, who later became dukes of Aquitaine (*q.v.*), of which it formed part. It was divided into lower and upper Poitou. Apart from Poitiers its chief towns were Mirebeau, Loudun, Niort, Luçon, Maillezais, Thouars, and Roche-sur-Yon. Since the Revolution it has been divided into the departments of Vendée, Deux Sèvres, and Vienne, stretching also into Charente and Charente Inférieure.

Poivre Hill. Hill of France, in the dept. of Meuse. Officially known as La Côte du Poivre, it is 1,120 ft. in height and is situated on the right bank of the Meuse, 3 m. N. of Verdun. It figured prominently in the German attacks on Verdun, Feb., 1916. See Verdun, Battles of.

Poker (Gael. *puic*, to push). Iron rod used for poking or stirring a fire. A poke bonnet is one with a projecting or poking front. Such were worn in the early part of the 19th century. The word poke also means a bag, as in the phrase a pig in a poke.

Poker. Card game. Various sources of origin have been claimed for it, the most authentic being that a species of poker played with 20 cards made its appearance in America on the Mississippi steamboats about 1830; this was afterwards superseded in 1860 by the now more prevalent draw-poker.

A full pack of cards is used (generally including the joker, which may stand for any card the holder chooses), bearing their usual face value, except that the ace may

count either as the highest or lowest. Five players make the best number. The dealer shuffles and makes up the pack, which is cut by the player on his right; he then deals five cards, one at a time, to each person. Every player is for himself, and the object of the game is to hold the best hand; the different hands ranking in this order: 1. A sequence flush: a sequence of five cards all of the same suit. 2. Fours: four cards of the same denomination. 3. A full: a hand consisting of three and two cards of the same denominations. 4. A flush: five cards of the same suit. 5. A sequence or straight: five cards of different suits, but all in sequence. 6. Threes: three cards of the same denomination. 7. Two pairs. 8. One pair. 9. Highest card.

If two players should each hold a sequence or pair, the one having the highest cards would win; a sequence of jack, ten, nine, eight, and seven beating one beginning with a nine; and a pair of queens would beat a pair of jacks.

Before the deal is completed the player at the dealer's left, who is styled the age, puts up half the stake he is willing to risk, called the blind. The next player looks at his cards, and if he considers them good enough to come in, doubles the blind; otherwise he throws down his cards and goes out. This continues with the other players until it comes to the turn of the age, who must either double his blind and play, or drop out and lose the amount of his blind.

Any player who has staked his money and has remained in the game is entitled to ask for one to five cards more to replace any of his original hand. The betting now starts, each player going above the other according to the strength of his hand; continuing until only two are left in, when one of them either gives way, in which event the cards are thrown in; or one player pays to see the other, the two hands being laid upon the table, the holder of the highest cards taking the pool. See Practical Poker, with a bibliography, R. F. Foster, 1904.

Poker-Work. Simple method of artistic decoration. Formerly a red-hot poker with a sharp point was used, and the design, after being drawn on wood, was burnt in, but a special apparatus is now in use, consisting of a lamp, with a tube and hand bellows, and a metal point, which is held in the flame until heated. Cedar, chestnut, pear, elm, and other woods are chosen, and leather, velvet, and other materials can be decorated with charming effect. See Pyrography.



Pokeweed (*Phytolacca decandra*). **PIGEON-BERRY OR RED-INK PLANT.** Perennial herb of the natural order Phytolaccaceae. It is a native of the warmer parts of N. America. It has large, fleshy, poisonous roots, and tall stems. The large, oval, alternate leaves become purple in autumn. The whole plant has an unpleasant odour. The root is emetic and purging, and a tincture of the berries is used as a remedy for rheumatism.



Pokeweed or Red Ink plant. Flower spikes and leaves; inset, flower

Pokomo OR **WAPOKOMO.** Primitive negroid people of Bantu speech. In Tanaland prov., Kenya Colony, they number about 18,000. See Bantu; Negro.

Pokuna. Artificial tank for bathing or holding drinking water, in ancient Ceylon. Innumerable at Anuradhapura, many are 150 ft. by 60 ft., and 25 ft. deep, with granite tiers, balustraded marble steps, and sculptural enrichments. They were used for ablutions and general water supply.

Pola. Town of Italy, in the peninsula of Istria. It was formerly the chief naval station of Austria-Hungary. There are two harbours, commercial and naval. E. of the commercial harbour are barracks, the custom house, and the 15th century cathedral; farther E. is

the wall-encircled **Castle Hill**, crowned by a castle built by the Venetians. A temple of Augustus, built 19 B.C., and the Amphitheatre, 435 ft. long, constructed of white Istrian limestone, are



Pola, Italy. Ruins of the Roman Temple of Augustus. Top, left, the amphitheatre from the south

monuments of the Romans. The Venetians removed the stone seats of the amphitheatre for building purposes. As *Colonia Pietas Julia*, the port was an important Roman naval station; captured by the Venetians in 1148, it was destroyed in 1379; in 1815 it became Austrian.

In the Great War part of the Austrian fleet was blockaded in Pola harbour by the Italians, who made several raids, Nov. 1, 1916, and May 14, 1918. On the latter occasion Italian naval men torpedoed an Austrian battleship. In Oct., 1918, Croatian sailors seized the fleet, and the Italians raided the harbour, blowing up the *Viribus Unitis*, and thus precipitated a crisis between Italy and Yugoslavia. The Italians occupied Pola early in Nov., 1918, and with Istria it passed to Italy by the peace treaty of 1919. Pop. 6,000. See Adriatic, Operations in the.

Pollacca. Three-masted ship common in the Mediterranean. Though square-rigged and carrying a jibboom, the main and fore masts are single spars, without top or crossrees. The name is Italian



Pollacca. Three-masted square-rigged vessel employed in the Mediterranean

meaning Polish. It is also a name for the *Polonaise* (q.v.).

POLAND: KINGDOM AND REPUBLIC

Robert Machray, B. C. Wallis, and A. W. Holland

This work contains articles on the cities, rivers, etc., of Poland, e.g. Cracow; Vistula; Warsaw; also on its leading men, e.g. Paderewski; John Sobieski. See Europe; Russia; Silesia

Poland of to-day is a republic of Central Europe, created by the Peace Conference following the



Poland arms

Great War. Its area is estimated at 241,400 sq. m. and its pop. at 30,000,000. It was created from Russian Poland, the kingdom proper, German Poland, i.e. Posen (Poznan) and part of German Silesia, and Austrian Poland or Galicia. The boundary with Lithuania was settled, Mar., 1923 (see Vilna). To the S. lies the Carpathian frontier with Czecho-Slovakia on the S. side, to the N. the boundary is the Baltic coast, Danzig, and E. Prussia.

Poland includes four types of country. A small area of Baltic

coastland in the N. has slopes rising S. to a broad gentle swelling some 600 ft. in elevation, where



Poland flag; white and red

numerous short streams drain to the Lower Vistula. S. of this lies the Polish plain, part of the Great European plain; from the N.E. flows the Nareff (Narew) and its affluents, from the E. the Bug and many tributaries drain into the Nareff just above its confluence with the Vistula; the W. of the plain is drained to the Oder. The third area is a region of low plateaux in Kielce and Lublin, cut by the Vistula and smaller streams; S. of the plateaux is the depression drained by the Upper Vistula and

the San, and beyond the rivers the N. slopes of the Carpathians, an upland country crossed by swift rivers with steep-sided valleys.

In the S. forest occurs above 2,000 ft., deciduous at lower levels and coniferous above; half this area is arable and there are summer pastures on the cleared heights. In the N. the poorer sandy soil limits the forest to a fifth of the area, and beech and oak are found as well as pine and spruce. The plains are two-thirds arable and the rest is half pasture, half forest; W. of Warsaw tillage is scientific, and there are good crops of sugar-beet. Most of the rivers are navigable, some have been canalised in parts, and canals use the ancient water-

ways. Warsaw and Posen are the chief rly. centres; both are connected with Danzig, but neither was directly connected, before 1914, with Cracow.

The Kielce plateau contains the great coalfield of the S.W., part of which is in the Oppeln district and on which a great manufacturing region has developed. Iron is mined near Oppeln and Opoczno and, with copper and lead, near Sandomierz. Lodz is a great manufacturing centre; flax and wool obtained locally and imported cotton are worked up into textile goods. Before 1914 Russian Poland yielded a fifth of the coal and a tenth of the pig-iron, iron goods, and steel produced in the Russian

Empire. Galicia yields petroleum and ozokerite. Rye is the chief cereal, and oats, wheat, and potatoes are grown. The people are in the main Roman Catholic Poles, a branch of the West Slavs. Living among the Poles, chiefly in the towns, are many Jews. On the outskirts of the republic there are Ruthenes or Little Russians in Galicia, White Russians and Lithuanians in the N.E. The country is relatively densely populated, for the S.W. and S. is the end of the belt of dense population which extends across Europe and terminates in Belgium and Holland.

The new republic has been divided into fifteen counties; this arrangement supersedes the former



Poland. Map of the republic which came into existence after the Great War, including territory formerly belonging to Russia, Germany, and Austria-Hungary, also showing the 1923 boundary with Lithuania

administrative divisions, governments in Russian Poland, provinces in German Poland, and small counties in Galicia.

The constitution of April 8, 1921, is based upon a franchise exercised by all adults except soldiers and government officials. The president is elected by the national assembly for seven years; any Polish citizen 41 years of age is eligible. He exercises treaty-making power, is supreme military commander, except in time of war, and convenes, opens, prorogues, and closes the Sejm or parliament. He is assisted in his executive functions by a council of ministers. The Sejm comprises a senate or upper house and a diet or lower house, both elective. Seventy electoral districts return 524 members to the diet. Local government is in process of unification.

B. C. Wallis

HISTORY. The Poles, a people of Slavonic race, gave their name to a country that came into existence as a distinct state about 1000, although the people themselves had probably had their homes in the district for some time before then. The region was regarded as part of the Holy Roman Empire restored by Otto the Great in 960, but the Poles had rulers of their own, and in A.D. 1000 one of these, Boleslaus, called himself king of the Poles.

This kingdom of Boleslaus was soon extended in every direction, for the king was a man of war and successful therein, but it fell almost to pieces after his death. Like other states of that time, its boundaries were rather indefinite, but for nearly 300 years they seem to have contracted until, about 1300, but little of Poland was left to the several princes who divided the land between them. The Tartars ravaged it, and as a counterpoise the Teutonic Order was invited to send settlers into the country, while many Germans also made their homes there.

A new era began with the reign of Ladislas, called the Dwarf. He was only duke of what was known as Great Poland, and reigned early in the 14th century. To his own Great Poland he added Little Poland, and made the country again formidable, especially after 1322, when he defeated in battle the formidable chivalry of the Teutonic Order. To mark his heightened position he took the title of king.

Casimir, called the Great, the son and successor of Ladislas, had a fairly peaceful reign, and as it was also a long one, he was able to bring about many desirable reforms. The result was a greater

amount of security, and with it a greater volume of trade and prosperity. The country was made larger, too, by his acquisitions of territory, but Great Poland, the district around the Vistula between Warsaw and Thorn, remained its heart. In 1320, however, Cracow, in Little Poland, was made the capital; about two centuries later Warsaw took its place.

When Casimir died his successor was his nephew Louis, king of Hungary, but his reign was short (1370-1382), and on his death there was trouble over the succession. He left only an infant daughter, who later was married to Jagiello, grand duke of Lithuania. He was crowned king of Poland as Ladislas II, and from this union sprang the family of Jagiellon that ruled until 1572.

The union of Poland and Lithuania did not last long, as in 1401 Jagiello gave up the grand duchy to his brother. The two rulers, however, made a pact to act together against joint enemies, the most formidable of whom were the Teutonic knights ruling the district that separated the two countries from the Baltic. Their troops then fought together at Tannenberg, July, 1410, the battle that more than any other destroyed the power and prestige of the order. Ladislas died in 1434, and, after his eldest son Ladislas III had reigned for ten years, his second son Casimir came to the throne.

Poland and Lithuania

Casimir was already grand duke of Lithuania, and once more the two countries came under the same sovereign. This, however, cannot be regarded as a real addition of territory to Poland, as was the result of the final struggle against the Teutonic Order. In 1454 some of the people in the lands ruled by the knights, being discontented, asked the Polish king to be their lord and master, their protector, as the political ideas of the age regarded it. He accepted the invitation, and with it went obviously the hostility of the knights. A long and desultory war, fought out mainly in East Prussia, followed, and then by the treaty of Thorn, 1466, Poland obtained districts that brought her northern border to the sea. Danzig, Thorn, Elbing, and Marienburg became hers, and the knights had to be content with the land east of the Vistula.

In the 16th century Poland attained the summit of her greatness. In 1526 Masovia, of which Warsaw was the capital, became by arrangement part of Poland; it had hitherto been an independent

duchy. Later, Courland became a vassal state, thus giving Poland another line of seaboard, while Livonia became a vassal of Lithuania.

In 1569 the union of Lublin effected a real union between Poland and Lithuania, and this date, only three years before the extinction of the Jagiellon family, marks a turning-point. By the union one parliament was established for the whole kingdom, which was then one of the largest in Europe. It included not only Poland proper and parts of Prussia, but also Livonia, Galicia, with Lemberg and great stretches of Russia from Courland almost to the Black Sea, while to the east its boundary was well beyond the line of the Dnieper. Within it were Volhynia (Wolyn), Podolia, and the various Russias—White, Black, and Little.

Trouble with the Cossacks

The collapse began with the death of the childless Sigismund III in 1572. No successor was ready, and, after some time, Henry of France, afterwards King Henry III, was elected. He remained in the country only for a year, and then Stephen Bathory, prince of Transylvania, was chosen. A Swede, Sigismund, came next, and both his reign and that of his son, Ladislas IV, were periods of success, although the nobles were following the selfish course to which the ruin of Poland is ascribed.

Difficulties of another kind arose through the action of the Cossacks. Many of these were subjects of Poland, and their business was to guard the frontiers of the kingdom. Their raids led to trouble with Turkey; religious questions were involved, for it was the age of the Reformation; and in 1638 the Polish diet deprived them of their old and cherished privileges. Just before this there had been two risings on the part of the Cossacks, and in 1648, the year of Sigismund's death, there was a more serious one, terrible in its horror and fury. The new king, John Casimir, could do little to check this, and seeing their opportunity, his land was invaded first by the tsar, and secondly by Charles X of Sweden.

Both wars were waged at the same time, and the danger roused the Poles to something like unity. Sweden's easy conquests were not retained, except that by the treaty of 1660 Poland obtained peace at the price of the cession of Livonia. In 1667 the Russian war was ended and Poland ceded some of the eastern parts of the kingdom. In 1674 John Sobieski was chosen king, and although he won glory

by his wars against the Turks, he saw and helped Poland on the way to anarchy and dissolution. On his death in 1696, the elector of Saxony, Augustus II, secured the throne, and in 1699 the war with Turkey was ended.

In 1700 there began a war between the powers of northern Europe, during which Poland was the main battleground. It ended in 1720, and in 1733, on the death of Augustus, Stanislas Leszczynski was chosen king for the second time.

Augustus II had suggested a partition of Poland, but it was not until some time after his death,

Kosciusko in 1794. By it much land was recovered from the Russians, but in the end, the Poles, having redeemed their follies by their gallantry, were beaten in 1795, and the final treaty of partition was signed; the carcass was divided between the three powers and Poland ceased to exist. In 1807, Napoleon created the grand-duchy of Warsaw, but it died in 1813, when the Russians entered its capital. The Congress of Vienna arranged a new partition, one feature of which was the establishment of a new kingdom of Poland, but of this the tsar of Russia was

treaty was signed between them, Mar. 18, 1921. Later the town and region of Vilna were claimed by Poland, and after prolonged dispute between that country and Lithuania the conference of ambassadors in Mar., 1923, allocated the territory to Poland.

LANGUAGE AND LITERATURE. Forming with Bohemian or Czech and Wendish the western group of the Slavonic languages, Polish is spoken by about 20 million people in Poland, Lithuania, and other parts of Europe. In flexibility, variety, and power, Polish rivals Russian. The Cyrillic alphabet, however, serves Russian better than the Roman does Polish, inasmuch as it can indicate the sounds of Slav words by combinations of appropriate letters. The disability of the Roman to do this results in that collocation of consonants which seems so intimidating in Polish, till it is explained that *sz=sh*, *cz=ch*, and *rz=zh* or *sh*; e.g. *Pszybiszewski* is pronounced *Pszybishev(v)ski*.

Polish literature is extensive, and much of it is high in quality. It has had a marked influence on Russian, Czech, Serbian, and Ruthenian literatures. The earliest extant Polish works were written in Latin, and consisted of monastic chronicles similar to those found in other European countries at the time, the principal being the *Chronicle of Martin Gallus* (d. c. 1140). The foundation of the university of Cracow, 1364, led to an increase in learning. The first printing press in Poland was set up in Cracow in 1475, but Latin was still used, and the first book in Polish did not appear till 1521.

Meanwhile the Renaissance, with its humanism, had enlarged the horizon of the Poles, and in the 16th century brought about what is sometimes called the Golden Age of Polish literature and the growing employment of the vernacular. Of the writers of this time Kochanowski was the greatest, both as poet and dramatist. Polish literature declined during the 17th century, owing to wars and internal troubles.

The rise of the Romantic School of Polish authors dates from about 1820. This school produced one writer of genius, and two of remarkable talent. The first was Adam Mickiewicz (*q.v.*); the others were Jules Slowacki (1809-1849), poet and dramatist, his most notable work being *King Mind*, and Zygmunt Krasinski (1812-1859), poet and thinker, whose chief work, the *Undivine Comedy*, deals with the sufferings of his unfortunate land. A prolific author was



Poland. Group of peasants in characteristic working dress

that, in 1772, the first took place. Prussia obtained West Prussia, but not Danzig, and also the regions around Kulm and Marienburg. Austria received much of Galicia, and Russia a district beyond the Dvina. Altogether Poland lost about a quarter of her territory.

Under a new constitution Poland lived for another twenty years. Her rulers took some advantage of the jealousies between the various European powers, and signed an alliance with Russia. The crown, then worn by Stanislas Poniatowski, was, in 1791, made hereditary, and another constitution, one giving to the people much of the political freedom, which the French revolution was demanding, was drawn up. This new constitution caused the next trouble. Some who disliked it appealed to Catherine of Russia, and when she declared war on Poland, Prussia declined to fulfil the terms of her alliance. Alone the Poles fought the Russians, but they could not stop their onrush, whereupon the Prussians, to secure something for themselves, occupied Great Poland. In September, 1793, the two invaders came to terms, and by the second partition Poland lost 250,000 square miles of her eastern provinces.

Little was now left, and the end followed the Polish rising under

king. In 1830, there was a rising of the Poles, which was only suppressed after hard fighting, and in 1863 there was another, after which the kingdom ceased to exist. As part of Russia, Prussia, and Austria, Poland remained until the Great War.

A. W. HOLLAND

Having dissolved the council of state in Oct. 1918, the regency council, which had been set up by the Austro-Germans in 1917, and consisted of three Poles, proclaimed the independence of Poland on Nov. 9, 1918. Five days later, General Pilsudski (*q.v.*) assumed the supreme power, and convoked a constituent assembly, for which elections were held, about 190 representatives being returned on a franchise that gave every Pole, male and female, over 21 a vote. Pilsudski became president on Feb. 20, 1919, with Paderewski as prime minister. The Versailles treaty, June 28, recognized the independence of Poland. Several changes of government took place, 1919-21, but Pilsudski remained president, and a constitution was adopted on April 8, 1921.

Poland was evacuated by the German troops by the end of 1918, but the Poles were almost constantly engaged in wars during 1919-21. In a struggle with the Bolsheviks they forced the latter back into Soviet Russia. A peace

J. J. Kraszewski (1812-1887), historian, poet, dramatist, publicist, and novelist, his works actually exceeding 600 vols. in number. Of the many writers of merit Poland produced in recent years the great commanding figure was that of Henryk Sienkiewicz (*q.v.*), a novelist of the highest rank. Other men of note were Milkowski, a vivid stylist who wrote novels of the Balkans; Korzeniowski, a dramatist of real life; Alexander Glowacki, a humorist of the type of Dickens; Pszybiszewski, a playwright of originality, whose *Homo Sapiens* made a great sensation; and Tetmajer, author of the novel, *Angel of Death*.

Robert Machray

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Polar Exploration. General term for the early voyages of discovery in the Polar regions of the Arctic and Antarctic Oceans and for the later attempts to reach the North and South Poles. See Antarctic Exploration; Arctic Exploration; Scott, R.F.; Shackleton.

Polaris. Name given to Alpha Ursae Minoris or the pole star, the nearest star to the North Pole of the heavens. See Pole Star.

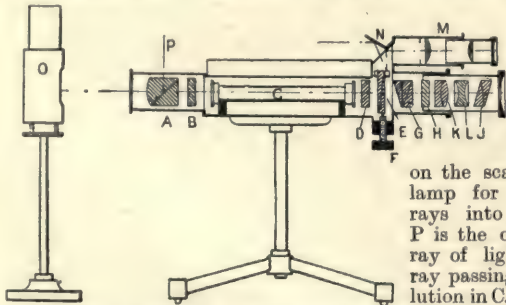
Polarisation of Light. An ordinary ray of light may be thought of as an axis, about which very small electro-magnetic vibrations are being executed at an exceedingly rapid rate, and in every possible direction perpendicular to that of the ray. Thus, in the case of a vertical ray of ordinary light

the vibrations are all horizontal, but may be directed to any point of the compass. The polarisation of light involves the reduction of these haphazard and disorderly vibrations to a more regular system.

The simplest type of polarisation is "plane polarisation," in which all the vibrations along the ray are in the same plane; in the case of a vertical ray of plane polarised light the vibrations would all be horizontal and all in a given direction, *e.g.* the N.-S. direction. A ray of light may also be circularly polarised, in which case the vibrations are executed in circles about the axis of the ray. The phenomenon of polarisation may be obtained very simply by passing an ordinary ray of light through a crystal of tourmaline or Iceland spar. One of the most remarkable properties of light, clearly showing its electro-magnetic nature, is the fact that the plane of polarisation can be rotated by the presence of a strong magnetic field. The passage of the ray through certain substances, such as quartz and various solutions, also causes a rotation of the plane of polarisation. See Crystallography; Light; Optics.

Polariscope. Optical instrument for exhibiting the properties of polarised light. It consists essentially of two parts, the polariser and the analyser, of which the first isolates the polarised beam, while the second enables us to observe its properties. The instrument may take various forms, according as the light is polarised by passage through a crystal or by reflection. The figure shows diagrammatically a standard polariscope. A is the polariser, B and D quartz disks, C glass tube with brass ends, in which is placed the solution being examined. The two quartz plates E can slide over one another, a screw and wheel, F, making the necessary adjustment. G is a Nicol prism, H and J regulator quartz plate and prism respectively. K and L are lenses, M a small telescope to enable readings to be taken from the vernier scale on the movable half of E. N reflects light

on the scale, while O is a lamp for providing light rays into the polariscope. P is the ordinary reflected ray of light, the polarised ray passing through the solution in C. A few number of parts are often used. See Polarisation of Light.



Polariscope. Diagrams of a standard instrument seen in section. See text

Polarity. Property of having poles, *i.e.* ends with some opposite quality or qualities. The best known example is the ordinary bar magnet with a N. and S. pole. The line joining such poles serves as an axis of reference in considering any physical problems, properties, etc., connected with the body.

Polar Regions. Term used to designate the areas which surround the earth's geographical poles. They are limited respectively by the Arctic and Antarctic circles.

At the spring equinox, in March, the North Pole begins its "day," which lasts for half a year until the autumnal equinox in Sept. On midsummer day, in June, there is no sunset visible anywhere within the Arctic circle. Between the Arctic circle and the North Pole there are periods without a single sunset between 24 hours and six months; the nearer the pole, the longer the period. Whatever is happening in the N., the exact opposite occurs at the antipodes in the South Polar regions; for when the N. is tilted towards the sun, the S. is tilted away to the same extent. See Antarctica; Arctic Circle.

Polder (Dutch). Name given to the low-lying areas of the Netherlands which have been reclaimed from the sea. They are used mainly for pastoral purposes, although considerable quantities of bulbs and vegetables are grown. See Netherlands; Zuider Zee.

Polderhoek. Village of Belgium, in the prov. of W. Flanders, about 1 m. S. of Polygon Wood (*q.v.*). Strongly fortified by the Germans, its famous ruined château was an objective of the British in the third battle of Ypres, when it was captured and lost, and finally retaken in the autumn of 1918. See Ypres, Battles of.

Pole. Long slender piece of wood used for various purposes; *e.g.* a carriage pole, a flag pole, and a barber's pole. See Maypole.

Pole. In geography, one of the two terminal points of the earth's axis. In astronomy, the celestial poles are those points in the heavens to which the earth's axis is directed. The poles of the horizon are known as the zenith and the nadir points. See Magnetism, Terrestrial.

Pole. Term frequently used by electrical engineers. In a magnet, for example, there are two poles, N. or positive and S. or negative. In a generator the positive pole is the terminal from which it is assumed that the current issues into the external circuit. The negative pole is that into which the current is assumed to flow from the external circuit. See Magnetism.

Pole. Measure of length, also known as the rod. It is $5\frac{1}{2}$ yds. long. A square pole covers $30\frac{1}{4}$ sq. yds.

Pole. Name of an English family famous for its nearness to the crown in the 15th and early 16th centuries. It was founded by a Yorkshireman, William atte Pole, who settled in Hull about 1300.

Sir William atte Pole, the younger, who lent money to the government and was a member of Edward III's parliaments, was the father of Michael Pole, who was made chancellor of England and earl of Suffolk. He, too, was very wealthy, but he had many enemies, and, after being impeached, his friend, Richard II, was obliged to abandon him, and he died in France in 1389. His son, restored to the earldom, died before Harfleur in 1415, and the next earl was killed at Agincourt. William Pole, or de la Pole, as the family is often called, became the 4th earl, and was later that duke of Suffolk so prominent during the earlier part of Henry VI's reign. He, too, lost his honours and estates before he died, but the dukedom was restored to his son John in 1455. (See Suffolk, Duke of.)

This John Pole, the 2nd duke, married Elizabeth, daughter of Richard, duke of York, and sister of Edward IV, and they had several sons to whom this relationship proved fatal. The eldest, John, earl of Lincoln, regarded at one time by Edward as heir to the throne, revolted with Simnel against Henry VII, and was killed at Stoke. The second, Edmund, who succeeded his father in the earldom but not in the dukedom of Suffolk, was handed over to Henry VII by Philip, the archduke, and was put to death in 1513. Another son, Richard, killed at Pavia in 1525, was the last male of the house.

Pole, REGINALD (1500-58). English cardinal. He was born in March, 1500, at Stourton Castle, Staffordshire, son of Sir Richard Pole and Margaret, countess of Salisbury, niece of Edward IV, and younger brother of Lord Montague.



Reginald Pole
Titian

Reginald entered the Church, retired from England to Italy in 1532, definitely broke with Henry in 1535, and was made a cardinal in 1536. During the reign of Henry and the Protestant government

under his successor, Edward VI, Pole could not venture to England; but on the accession of Queen Mary (1553) he was sent to England as papal legate to effect the formal reconciliation of England with Rome. Arriving Nov. 25, 1554, he immediately became Queen Mary's most trusted confidante, and was elevated to the vacant see of Canterbury. He died Nov. 17, 1558. See History of the Life of R. Pole, T. Phillips, 2nd ed. 1767; Lives, T. G. Lee, 1888; M. Haile, 1910.

Pole-axe. Military weapon used up to the 16th century by mounted soldiers. It consisted of a hatchet blade, and serrated hammer, on a short handle, and was a later form of the battle-axe (q.v.). A more modern form of pole-axe was used for slaughtering cattle, but during the 20th century it gave way to more humane methods. See Armour.

Pole-Carew, SIR REGINALD (1849-1924). British soldier. Born at Antony, Cornwall, May 1, 1849, he was the son of a Cornish landowner of old family. Educated at Eton and Christ Church, Oxford, he entered the Coldstream Guards in 1869, rising in 1896 to the command of a battalion. Meantime he had been attached as A.D.C. to the duke of Connaught and other soldiers in high position, had been military secretary to Lord Roberts, and had seen active service in Afghanistan, 1879, Egypt, 1882, and Burma, 1886. In 1899 he commanded the brigade of guards, and later a division, against the Boers, being knighted in 1900. He retired from the army in 1906, returning during the Great War as inspector-general of the Territorial Force. From 1910-16 he was Unionist M.P. for Bodmin, and died Sept. 19, 1924. Sir Reginald married Lady Beatrice Butler, daughter of the marquess of Ormonde. Pron. Pull-Carey.



Sir R. Pole-Carew,
British soldier

Polecat (*Putorius foetidus*). British carnivorous mammal, belonging to the weasel tribe. It is about 17 ins. in length and has a short bushy tail. The general colour of the fur is blackish brown, the under-fur being yellowish brown; the legs are black, the rims of the ears and the lips white, and there is a bluish-grey band across the forehead. It makes its home in deserted rabbit holes, old buildings, and crevices in rocks;

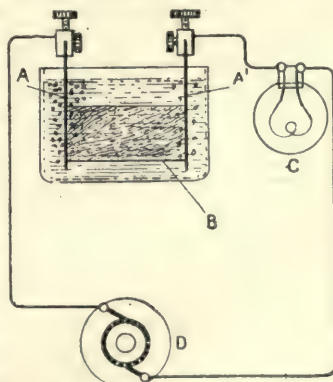


Polecat, small savage mammal found in parts of Britain

W. S. Berridge, F.Z.S.

preys upon small mammals and birds, frogs, reptiles, and eggs, and is very ferocious in disposition, often killing for mere sport. The polecat breeds in May, the nest being usually made in a rabbit burrow. See Ferret.

Pole-Finder. In electricity, an apparatus for determining the polarity of the leads in a direct-current circuit. For low voltages a kind of galvanometer is used, the direction of the needle's deflection showing the polarity relatively to the coupling of the leads with the terminals of the instrument. The polarity of high-tension currents is decided electrolytically, either by bringing the leads into contact with a specially prepared and moistened paper, which changes colour at one or other pole; or by immersing both leads in water, when hydrogen gas is given off freely at the negative terminal. To test a dynamo for polarity before connecting up to an accumulator, two strips of clean lead, kept two inches apart by a strip of wood, are immersed in dilute sulphuric acid and put in circuit with the dynamo and with an incandescent lamp as resistance. After current has been passing for a short time the strip connected with the + terminal turns brown. See Electricity; Polarity.



Pole-Finder. Diagram of apparatus for determining polarity. AA', lead strips. B, Wood insulation. C, Incandescent lamp as resistance. D, Dynamo, the polarity of which is to be determined

Polemoniaceae. Natural order of annual and perennial herbs (a few shrubs), natives of cold and temperate regions. They have tubular, or bell-shaped, showy flowers. The order includes the genera *polemonium* (Jacob's-ladder), *phlox*, *gilia*, and *collomia*.

Polenta (Ital.). Favourite food in Italy. It is maize meal made into porridge, and when served hot eaten with milk and salt or sugar. When cold, it is cut into slices, powdered with grated cheese, and fried. This dish is a favourite with Americans as well as Italians.

Pole Star OR **POLARIS.** Nearest conspicuous star to the N. Pole in the sky. It is a second magnitude star forming alpha in the constellation of Ursa Minor. It is easily found by following up the line joining the stars alpha and beta, or the pointers of the Great Bear. The star is certainly double and probably treble, two companions being indicated by the irregularity of its motion. It is $1\frac{1}{2}^\circ$ from the true pole. See Precession.

Polesworth. Village of Warwickshire, England. It stands on the Anker, 4 m. from Tamworth, with a station on the L. & N.W. Rly. There is a church dedicated to S. Edith, and the main industries are quarrying, coal-mining, and clay-working. Pop. 5,600.

Police (Fr. from late Lat. *politia*, civil government; Gr. *polis*, city). Civilian or semi-military force appointed by the government or other constituted authority to preserve law and order. Not until Peel's Act of 1829 "for improving the police in and near the metropolis" were there any properly organized police forces in the United Kingdom. Towards 1800 in rural districts and provincial towns high constables and parish constables, acting under the direction of justices of the peace, appointed what officers were necessary to keep the king's peace. Many were unpaid, and the majority received payment totally inadequate to their duties and responsibilities, resulting in a scandalous state of inefficiency. London had a number of police organizations so badly managed that twelve parishes were entirely unprotected, while the watchmen in many other parishes were nothing more than paid blackmailers.

The Act of 1829 brought the London police, with the exception of the City police, under the home secretary, defined the Metropolitan police district, and appointed two justices of the peace, afterwards called commissioners, to frame the necessary regulations, etc., for the management of the new force.

Despite the great unpopularity of the new police, as they were called, in less than twelve months from the passing of the Act practically the whole of London was policed under one authority. Public hostility against the police culminated in a series of riots, but gradually the force won recognition and respect by its vast superiority over the old watchmen, Bow Street runners, and the like, and requests began to come in from the provinces requesting the loan of competent officers to reorganize the existing forces.

English Provincial Police

Under the Municipal Corporations Act of 1835 watch committees came into existence in the provinces, responsible for the appointment of head and other constables and for the regulation of the police. These committees were required to make a return of the police under their jurisdiction to the home secretary every quarter.

In 1839 the passing of an Act enabled a majority of the justices

regard to pay, allowances, pensions, and conditions of service. The committee recommended increases of pay, and the establishment of a police federation on a democratic basis, embracing all members of all the police forces below the rank of superintendent. The latter was to meet the objections that the police were not allowed to form a union, and the former to improve the utterly inadequate remuneration which had resulted in a police strike in 1918. The recommendations were made law under the Police Act of 1919.

In Aug., 1920, the employment of suitable women police was recommended by a committee appointed for the purpose. In 1921 police motor cyclists were appointed in London to exercise control over traffic, and a "flying squad" formed to enable the criminal investigation department to meet the changed conditions which came about owing to the increased use of motor-cars by criminals.

Under the Act of 1856 inspectors

of constabulary make annual reports to the home secretary upon the various police forces. On these reports depend the granting of an efficiency certificate and the consequent contribution of half the cost of pay and clothing of the force by the treasury. The remainder of the cost is paid by a special police rate. By the Act of 1888 no borough with less than 20,000 inhabitants can have a borough police force.

Scottish and Foreign Police

In Scotland the police are appointed under the Police (Scotland) Act, 1857, and the Burgh Police (Scotland) Act, 1892, under similar conditions to the English police. In Edinburgh, Glasgow, Aberdeen, Dundee, and Greenock the police are appointed under special Acts of Parliament.

Foreign police are more of a military or semi-military character than the British. Germany, France, Austria, Hungary, etc., and many British colonies have semi-military organizations often with far wider powers than those allowed British police. See Constabulary, Royal Irish; Detective; Metropolitan Police; Mexico; New Scotland Yard; Special Constable; consult also A History of Police in England, W. L. Melville Lee, 1901; European Police Systems, R. B. Fosdick, 1915.

J. L. Pritchard



Police. Motor police van for conveying prisoners

at quarter sessions to raise and equip a paid police for the protection of their county, thus inaugurating the county police as distinct from the borough police under the 1835 Act. The actual organizations of the police forces of the provinces followed very similar lines to that of the Metropolitan police. Many Acts, amending the powers of boroughs and counties, have been passed since those of 1835 and 1839, with the result that all the police forces in the United Kingdom are now under control of local authorities, with the exception of those of Ireland and London. The City of London police are controlled by the corporation, its commissioner being appointed by the court of common council.

In March, 1919, a committee on the police service was appointed by the home secretary. The inquiry covered nearly 250 separate forces, and recommended that the general police system be maintained on its present lines, but with a greater degree of standardisation with



1. Horse-drawn prison van or Black Maria, with warder sitting at door. 2. City policeman in summer and, 3, winter uniform. 4. Thames police-boat. 5. Motor ambulance. 6. Metropolitan police-serjeant. 7. Mounted constable. 8. Inspector. 9. Policewoman. 10. Special constable

POLICE: CITY OF LONDON AND METROPOLITAN GUARDIANS OF THE PEACE

Specially drawn for Harmsworth's Universal Encyclopedia by J. F. Campbell

Police Court. Court of the first instance or court of summary jurisdiction. In London and some other towns such courts are presided over by stipendiary magistrates, and they are dealt with in this work under Metropolitan police courts. The judges of other police courts are styled justices of the peace and are unpaid. *See* Justice; Magistrate.

Polignac, AUGUSTE JULES ARMAND MARIE, PRINCE DE (1780-1847). French politician. Son of



Prince de Polignac,
French politician

Jules, duc de Polignac (1745-1817), he was born May 14, 1780, and spent his early years in exile in Russia and England. He was imprisoned for participation in the Pichegru conspiracy, 1804, but returned on the restoration, 1814. Made peer of France, 1815, he was ambassador in London, 1823-29, when he became minister of foreign affairs under Charles X. He promulgated the Ordinances of St. Cloud which precipitated the revolution of 1830. Condemned to life imprisonment in that year, he was pardoned, 1836, published his *Études Historiques, Politiques et Morales*, 1845, and died March 2, 1847. *Pron.* Po-linyak.

Polignac, MELCHIOR DE (1661-1742). French cardinal and diplomat. Born at Puy-en-Velay, Oct.

11, 1661, he showed brilliant scholarship at the Collège de Clermont and was present at the papal elections in 1689 and 1692. Ambassador to Poland, and subsequently plenipotentiary in Holland, he negotiated the treaty of Utrecht, and became cardinal in 1713. Forced into retirement during the regency, he was, however, diplomatic representative in Rome, 1725-32, and was made archbishop of Auch, 1726. A man of considerable literary ability, he was member of the Académie Française, 1704, and his Latin poem, *Anti-Lucretius*, appeared in 1745. He died in Paris, April 3, 1742.



M. de Polignac,
French cardinal

Poligny. Town of France. In the dept. of Jura, it is picturesquely situated at the foot of the Jura Mts., 38 m. S.W. of Besançon. It contains the ruins of a château, and the early Gothic church of S. Hippolyte. Trade is carried on in wine

and agricultural products, and there are oil refineries. The town was captured several times during the wars of religion. Pop. 4,000.

Poliomyelitis. Acute anterior poliomyelitis is an infectious disease, most frequently attacking children. Chronic poliomyelitis is a disease of adults characterised by increasing atrophy of the muscles. *See* Infantile Paralysis.

Polish. Substance for improving the appearance of woodwork, metal work, leather, etc. A fine

surface used to be given to wood by mere friction, mahogany, for instance, being treated by passing a heavily padded slab of stone backwards and forwards over a surface powdered with brick dust. This method gave a beautifully soft glow to the wood, and threw up its colour. French polish is the one now in general use, while oak and a number of other woods are polished with wax. *See* French Polish; Furniture Polish; Metal Polish; Plate Powder.

POLITICAL ECONOMY & ITS TEACHERS

Sir W. J. Ashley, Professor of Commerce, Birmingham University

See the articles on the various terms used in political economy, e.g. Capital; Labour; Land; Rent; Wages; Wealth; also the biographies of leading economists, e.g. Mill; Ricardo; Smith, Adam. See also Socialism

The term political economy as the subject of a treatise was apparently first used by a French writer, Montchrétien, in 1615; but it did not begin to come into general use till the second half of the 18th century. For the last hundred years political economy has usually been defined as the science concerned with the production, distribution, and consumption of wealth. After distribution has often been added exchange; each of the substantives in the definition being used in a special sense. The definition owes its vogue to the first systematically arranged and lucidly written text-book of Political Economy, also by a Frenchman, J. B. Say, 1803; to whom it was probably suggested by the title of the widely read articles of Turgot, *Reflections on the Formation and Distribution of Wealth*, 1770.

The substance of Say's book, however, was little more than a popularisation of the great work of Adam Smith. Smith's *Inquiry into the Nature and Causes of the Wealth of Nations*, 1776, has been incomparably the most influential of all economic writings, determining the character and scope of the new science almost up to the present. Without essential originality or real profundity, Smith seized and retained the attention of contemporaries and succeeding generations because of the judgement and literary skill with which he acted, as it were, as editorial secretary to a vast movement of thought struggling to find expression, and destined deeply to affect human society.

Earliest in its influence on Smith was the natural law or natural jurisprudence, which was among the main subjects of his teaching as professor of moral philosophy at Glasgow University. The origins of this jurisprudence in the philosophy of the Greeks, especially of

the Stoics, and in the labours of the Roman legists, are traced in the earlier chapters of Maine's *Ancient Law*. For the modern world its creator was Grotius.

In *The Law of War and Peace*, 1625, by Grotius, appeared a chapter on contract; and in that chapter there was a brief section upon the causes determining the price of commodities. This forms the starting point of all that economists have written since on the subject of value. As university life revived in Western Europe, and as the conspicuous growth of trade and the substitution of money contracts for feudal obligations forced new topics upon the attention of university teachers, these few sentences of Grotius were more and more commented on and expanded. The treatise of Pufendorf, *The Law of Nature and Nations*, 1672, which quickly became the leading authority on natural jurisprudence, devoted a whole chapter to the subject of price. At Glasgow, Pufendorf's teaching was adopted and enlarged by Hutcheson. Adam Smith was his admiring auditor and reader; and as professor himself between 1752 and 1763, he went over the same ground in the same spirit. The chapters on value and price, set near the forefront of *The Wealth of Nations*, are an enlarged reproduction of ideas derived through Hutcheson and Pufendorf from Grotius.

This is the historical explanation of the place subsequently assigned to value in economic text-books. It is true that with Smith the chapters on value have little bearing on the teachings of the rest of the book. But they did much to create and confirm in his successors the habit of conceiving of the economic world as a world exclusively dominated by contract, and by contract between individuals standing, in respect of their bargaining,

on a footing of equality. Later writers, indeed, could not be content, either with Smith's superficial analysis of the play of individual wills in the bargaining process, or with the want of relation, in Smith's treatment, between the doctrine of value and the rest of the exposition.

Accordingly, some of them have since given an amount of attention to the psychology of value which has been doubtfully remunerative; chief among them Jevons, Theory of Political Economy, 1871, and Menger and "the Austrian school," whose line of thought has been made accessible to English readers by Smart, Introduction to the Theory of Value, 1891. Others, notably Marshall, Principles of Economics, 1890, have sought to present the forces of supply and demand, which determine value, as determining fundamentally the whole of economic life, and thus to make the doctrine of value the key to every part of political economy. As one among diverse methods of approach, such an attempt is undoubtedly helpful, but to force all the rich material of economic inquiry into the framework of a theory of value stretches the formulae to the breaking point. It would probably occur to no one to-day who came to economic study after a training in present methods of scientific inquiry, and it seems to be only explicable as a survival from a long-lived academic tradition.

Development in the 18th Century

The second strain in Smith's economics, and therefore in subsequent English economics, came from the prevailing moral philosophy of his time. This sprang out of the same root ideas as natural jurisprudence; but in the first part of the 18th century it received special development at the hands of a number of writers, of whom Shaftesbury was the most influential; so that by 1729 it could be marked off from the general field of philosophy and made the special subject of Hutcheson's professorship at Glasgow, to which Smith subsequently succeeded. In essentials, Smith's teaching was an application to the economic field of Shaftesbury's ideas but slightly modified. It started from the individualistic point of view; it regarded benefit to society as the criterion of the moral character of actions; and it held that, within very wide and ill-defined limits, the well-being of society was brought about by individuals following their natural passions or feelings. In particular, the pursuit of individual material self-interest, though

in fact dictated in the individual by mere selfishness, was justified, it held, by its results to society.

This belief was both an effect and a cause of a quite genuine optimistic theism, though hardly the theism of the Christian Gospels. The Author or Director of Nature had "contrived," so it was held, "the machine of the universe so as at all times to produce the greatest possible quantity of happiness." Foremost among the natural impulses with which humanity had been started on its career was the motive of self-interest. Superficially, its operation might often appear repulsive, but since "no partial evil" could have been "admitted into the system of divine government" which was not "necessary for the universal good," one might "admire the wisdom of God even in the weakness and folly of men."

Political Economy a Science

These are expressions from Smith's Theory of Moral Sentiments, 1759, which gives the philosophical basis of The Wealth of Nations. But he does not hesitate to be equally explicit in his economic treatise where a confession of ultimate faith seemed to be called for. Speaking of what happens when governmental restraints on the investment of capital are removed, "every individual," he says, "intends only his own gain, and he is in this, as in many other cases, led by an Invisible Hand to promote an end which was no part of his intention."

Such a view had a vital effect on the subsequent development of political economy. In the first place, it transformed it from an art to a science, in the senses in which these terms are usually contrasted. By an art is here meant a body of rules for practice, of prescriptions for conduct, of ideals; by science a body of statements of fact, or of conclusions as to the necessary result of assumed premises. This is clear, in spite of the somewhat befogging expressions of Smith himself. He started, for instance, the literary practice of regarding the writers on economic topics in the generations preceding him—subsequently known as Mercantilists—from Mun, England's Treasure by Foreign Trade, 1664, to Steuart, Political Oeconomy, 1767) as economists with a system comparable with his own. It is true that formally much of their teaching may be represented as corollaries from a belief, "scientific" if erroneous, in the peculiar importance to a country of money. But their usual attitude was really that of persons giving a particular piece of advice or urging a par-

ticular policy; they had usually some definite purpose before them; and they were many of them inspired by an ideal—that of state-making; they did not pause for any conscious analysis of fact or tracing of causal sequence.

The still earlier Canonist teaching—the teaching of medieval churchmen and schoolmen—exceedingly different as it was from Mercantilism in its precepts, resembled it in driving directly at practice. Its lessons as to usury and just price laid down rules for personal conduct, which were buttressed, no doubt, by a certain number of theoretic conceptions and unconsciously founded on a correct perception of existing conditions, but they drew their authority from a direct appeal to the Christian conscience and to Scripture. Much the same must be said, *mutatis mutandis*, of the economic observations to be found in Plato and Aristotle and the Greek philosophers; they are ideals or rules for personal guidance. We of to-day can put together something like a Mercantilist or a Canonist or a Greek science of Economics, but it is only by doing for them a work of systematisation and analysis which they did not do for themselves.

The Policy of Laissez Faire

It is noteworthy that Smith did not himself draw the distinction we are now considering, and, while he described political economy as a science, defined it as an art: "Political Economy, considered as a branch of the science of a statesman or legislator, proposes two distinct objects: first, to provide a plentiful revenue or subsistence for the people . . . ; and secondly, to supply the state or commonwealth with a revenue sufficient for the public services. It proposes both to enrich the people and the sovereign." Here the first clause repeats in slightly different language a definition already framed by his Mercantilist predecessor Steuart; but Smith inserts, in the space left vacant above, the significant explanation: "or, more properly, to enable them to provide such a revenue or subsistence for themselves." This insertion leads the way for the transition from the standpoint of an art to that of a science. For if, as Smith thought, "all systems either of preference or restraint being completely taken away, the obvious and simple system of natural liberty establishes itself of its own accord"; and if, when "every man is left perfectly free to pursue his own interest his own way" the best possible social results follow, then all the economist has to do, when once restraints

are removed, is to state as a fact how Nature's machine actually works. The economic art shrinks into the simple rule "leave people alone," *laissez faire*.

Influence of the Physiocrats

Much of the economic discussion in subsequent times, as soon as the glow of optimistic assurance began to fade away, has been occupied with the scrutiny of this position. Two questions in particular have had to be faced. First, to what extent now, or at other periods, do men and women indeed act on motives of material self-interest, so far as they are left alone by the state or their fellows? Smith undoubtedly supposed that they are so far actually moved by self-interest, that the picture of a world governed by that motive is a picture of the real world.

Later writers, notably Bagehot, have argued that the science, as Smith and Ricardo created it, is essentially hypothetical; not necessarily presenting a picture of the tangible and visible phenomena, but simply a scientific device to get near to reality in a limited part of the field, and a first, though often a most imperfect, approximation to it, in the rest of the field. The second question is involved in the optimistic interpretation. Are the results of the pursuit of self-interest predominantly good, as Smith clearly took for granted? Is the world of competition in the main a good world, or only the best of possible worlds? Or is it not even that?

It was the third and latest influence on Smith which finally determined the shape political economy has since assumed. This was the influence of the group of French writers now only called "the Physiocrats," but then, and for half a century, known all over Western Europe as "the Economists." The founder of this school, or sect, was François Quesnay, a court physician of Louis XV. By Quesnay the current philosophy of the beneficence of Nature was applied, in a series of writings, first to the medical art, opposing the practice of bleeding and asking that nature should be left to itself; and then to the art of government, especially in the economic sphere. His *Tableau Économique*, the much lauded arithmetical formula giving a graphic presentation of his views, appeared in 1760, and during the whole of 1766 Adam Smith, then residing in Paris, frequented the gatherings of the inner circle of his disciples.

The Physiocrats were characterised by a particular doctrine from which Smith was prudent

enough to dissociate himself in terms, though he accepted it in essence, the doctrine that agriculture alone is "productive" and that manufactures and commerce are "sterile." What was more permanently important, they were characterised by a conception of the shape and content of their science which Smith took over without comment; though it was left to Ricardo and his followers to give the idea its dominating place in the fabric of economic science. It was the conception which identified the main body of the science with a theory of "distribution."

By "the distribution of wealth" was not meant by them or by economists afterwards either the physical distribution of commodities from their places of production, nor the partition of wealth among its actual holders, but, in the language of Smith, "the order in which the produce of labour is *naturally* distributed among the different ranks of the people." By "different ranks" the context shows he means "labourers," "employers of capital" (or "capitalists" as James Mill in his *Elements of Political Economy*, 1821, set the example of calling them), and "landlords." The "natural distribution" was that set forth in the doctrines or "laws" (as they were later designated, e.g. by John Stuart Mill in his *Principles of Political Economy*, 1848) of wages, profits, and rent. With the growth of capital in the 19th century, and the increasing separation in real life between the ownership and the use of capital, profits have been split up by later economists into interest and "pure" or "net" profit.

Creators of 19th Century Economics

But however the Physiocratic and Smithian conception of Distribution may since have been refined, it starts with assuming what is a large part of the problem to be explained, namely the existence of "the different ranks of the people." Granting the existence of landowners and capitalists and labourers, and granting that they are governed by motives of personal and material interest and unrestrained by the state or by smaller groups, it is not difficult to trace what the results will be in the way of rent, profit, and wages. But the forces of self-interest operate in conditions created by a long course of history, and imply the acceptance and enforcement of specific conceptions of property, contract, and inheritance.

With the Physiocrats the transition from the point of view of an

art to that of a science had taken place before it happened to Smith; and for this reason, and because they marked out the lines on which the structure of political economy was subsequently erected, the Physiocrats are entitled to be regarded as the true creators of 19th century economics. Smith has obscured them because he dropped the particular doctrine, and its corollary, the proposal of a single tax, which had laid them open to ridicule, and commended their general doctrine to Europe in a more effective form, with a wider range of historical knowledge, and in external association at any rate with a doctrine of Value.

"Scientific" Socialism

The impulse from France emboldened Smith to plan his treatise on a more ambitious scale and added to the material for its construction: it did not enable him to fuse the three constituents into a correlated whole. To make of political economy the neat bundle of half a dozen interdependent "laws" which it afterwards became, and to apply these laws rigorously to the problems of taxation, was the work of Ricardo, in his *Principles of Political Economy and Taxation*, 1817, and of his popularisers, especially James Mill. It was effected by dropping Smith's historical disquisitions, which were, indeed, often what his biographer Dugald Stewart called "conjectural history"; for Smith's was a deductive mind, and used history to corroborate and not to ascertain. It was effected, further, by pushing deductions from the motive of interest to their logical conclusions. It was effected, finally, by taking over from Malthus as a second dominating force in economic life by the side of competition "the principle of population," which suggested a very depressing outlook for the human race.

So-called "scientific" socialism, whether in its earlier form, based by Lassalle on an "iron-law of wages," or in its later and more prevalent form, based by Marx on the doctrine of "surplus-value," is historically simply a chapter in 19th century political economy. It is this, inasmuch as Lassalle built on Ricardo's own teaching as to wages, itself an echo of the Physiocrats; while Marx built on Ricardo's teaching as to value, which was taken from Adam Smith. "Scientific" socialism has shared the economists' habit of looking for a simple and single solution of all economic problems, as well as their reliance on abstract and deductive methods of reasoning.

As taught to-day in universities and expressed in recent text-books, political economy would seem to be in process of transforming itself into a science of observation, generalising by the aid of the available methods of history, statistics, and description. It may be anticipated that in the future fabric of the science, brief trains of deductive reasoning, starting from the premises of competition, will find a very useful place as suggesting or confirming the explanation of the phenomena; or if not explaining, at least illuminating them. But it will be only when political economy has freed itself from the intellectual shackles of the old framework of the production, distribution, and consumption of wealth, as the 19th century economists commonly understood those terms, that it will become a science of the production, distribution, and consumption of wealth, as the life of society in fact exhibits them.

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Economy, J. S. Mill, new ed. 1909; *Introduction to the Theory of Value*, W. Smart, 1910; *Theory of Political Economy*, W. S. Jevons, new ed. 1912; *Dictionary of Political Economy*, ed. R. H. I. Palgrave, new ed. 1913; *Economic Organisation of England*, W. J. Ashley, 1914; *Economics: an Introduction for the General Reader*, H. Clay, 1916; *Industry and Trade*, A. Marshall, 1919.

Political Offences. In English law, the only notice taken of an offence against government, commonly called a political offence, is when it is committed against a foreign government. That is to say, a criminal who has committed a political offence in a foreign country and has escaped to British shores will not be extradited. But in the case of an offence in the British Isles or Dominions, if it is a violation of the law of the land it is punishable just the same whether its motive is political or any other. At the same time, the authorities very often mitigate the punishment when the motive is political, as they recognize the difference between infraction of law from a desire to improve the government of the country, and its infraction from a bad motive. See Extradition.

stitution? (2) What are the proper limits to government intervention, and what spheres of human activity should be left to individual initiative? From Plato and Aristotle to near the end of the 19th century, it was mainly the first of these two problems that received attention: the rival merits of democracies, aristocracies, and monarchies, the conflicts between kings and parliaments. The second group of questions has only recently been thrust upon public attention, with the discussion of the rival merits of state-action and *laissez-faire*, of socialism, collectivism, and individualism, with their modern developments of anarchism and syndicalism.

There is, perhaps, no question vitally affecting individual or national life that has not, at some period of history, formed the subject of keen political controversy. Here reference can be made to three only of the main groups of problems: (1) the distribution of power between central and local authorities; (2) the relations of Church and State; (3) the protection of minorities against encroachment.

Government in Early England

The entire history of England forms a dissertation on local government. Anglo-Saxon kings, like Alfred or Edgar, ruling the mixed races of the North and Midlands from distant Winchester, were, in the absence of railways and good roads, dependent on their provincial rulers; and a dilemma thus arose. A weakening placed over Mercia or East Anglia failed to enforce order at home and to provide against Danish invasions; a strong local ruler, on the contrary, might grow so strong as to defy his king. Under the Norman sovereigns the problem took new forms. Each county, or group of two counties, was administered by a sheriff, whose tenure of authority and distance from the royal seat tended to abuse of power, and able kings like Henry II invented expedients to curtail their dangerous local greatness. At the present day the problem has taken forms even more important, and is familiar under various names, *e.g.* Home Rule for Ireland, the position of the Oversea Dominions, Federation for the Mother Country and the Empire, and the relations between the various independent states and the League of Nations.

The problem of the relations between Church and State appeals to many as even more important than that of central and local government. Broadly speaking, four rival theories here contest

POLITICS: SCIENCE OF GOVERNMENT

W. S. Mackenzie, M.A., D.Ph., Author of *The State & the Individual*

This Encyclopedia contains articles on the various forms of government, e.g. Democracy; also on the political parties, Conservative; Liberal; Republican, etc. See also Aristotle; Government; State

Politics (Greek *politeia*, from *polis*, city or state) is the art, science, and philosophy of government. Rightly considered, political theory is co-extensive with all those branches of knowledge which treat of the eternal principles on which depend the happiness, prosperity, and moral elevation of mankind grouped into kingdoms, states, or nations. The full history of its development would extend from the theories of Plato and Aristotle to those which have been embodied in the League of Nations.

Two ideas, simple yet inexhaustible, underlie all such speculations. The two pillars on which organized society is erected are described sometimes as permanence and progress, sometimes as authority and liberty. The hard-and-fast antithesis thus drawn, however, is more apparent than substantial. Progress towards a definite goal is assured only after stability has been established, and in historical sequence, if not in logical priority, order always precedes freedom. Obedience to the law, and to the magistrates who enforce it, is essential to the rearing of constitu-

tional progress on enduring lines. Neither of the two essentials can exist without the other. Liberty without restraint degenerates into anarchy; authority by itself is tyranny. The problem of political science is how to combine the two in such manner as will bring out fully what is best in both.

The Main Problems

The inhabitants of all politically minded countries tend to fall into two groups, according as emphasis is placed on one or other of these conceptions. Conservative is the name usually given to those who wish above all things to perpetuate the institutions that have maintained an orderly society in the past; while the worshippers of progress and freedom, as liberals or reformers, are intent on the removal of all restraints or hindrances that seem to have outgrown their own usefulness. The difference is one of degree rather than of complete antipathy.

It is the duty of the constitutional theorist to reconcile the claims of both, and in this endeavour two main problems face him: (1) What is the ideal form of con-

the field. The first theory is one of dualism. Each of the great entities known respectively as Church and State has its own distinct province and need never encroach on that of the other. The civil arm must leave conscience free; ecclesiastics may persuade but never coerce the temporal powers. Collision is thus assumed to be impossible, where each side loyally observes the terms of the pact. This was the theory upon which the relations of Papacy and Holy Roman Empire were supposed to depend throughout the Middle Ages.

The Crucial Problem

Unhappily, this theory proved impracticable. The history of the Middle Ages is one long, sad record of strife between Pope and Emperor, Guelph and Ghibelline, Church and State. Philosophers and men of common-sense unite to-day to ridicule the possibility of a hard-and-fast division between two spheres labelled respectively as temporal and spiritual.

A second theory presented all Christendom as forming one commonwealth, one spiritual and material whole, over which Rome was supreme, while the various kingdoms of Europe formed its members. In reaction against this doctrine, the Tudor sovereigns of England, particularly Henry VIII and Elizabeth, were the protagonists of very different views. Papal interference in England was rudely shaken off, and the Church in England became one administrative department among many, falling into line with the chancery, the exchequer, and the admiralty. Henry, as head of the state, claimed the right to regulate the religious thoughts and observances of his subjects.

The fourth theory is the voluntary principle, in virtue of which many churches may exist under the protection of one state. The civil government, while refusing to set limits to its own absolute sovereignty, disclaims in practice all intention of direct interference in matters of conscience, securing liberty of thought and action to all sects and creeds alike, and treating each religious communion as a voluntary association substantially on the same basis as associations founded for social, economic, or commercial aims.

What is, perhaps, the most crucial problem of all is that of the most effective method of protecting individual rights and liberties from the tyranny, whether of the one, the many, or the few. In ancient Greece and Rome this problem assumed the form of how best to reconcile a sufficiently powerful

executive with constitutional liberty. In Athens and in Sparta the kingly power proved dangerous and was deliberately weakened by division. This principle was carried further in Rome, as a reaction from the tyrannies of Tarquinius the Proud. One king, enjoying a monopoly of kingship, gave place to a number of magistrates known respectively as censors, consuls, praetors, aediles, and tribunes of the plebs.

In England of the Middle Ages a similar menace was met by a new expedient, destined to be of world-wide beneficence, namely, Parliamentary control. The English monarchy which, for a century after the Norman Conquest, had stood for order as against the barons' wild and lawless anarchy, seemed to change its policy under John. The crown then claimed the widest licence in breaking its own rules, while the barons seemed to stand for law and order in compelling the grant of Magna Carta: the chief problem of English politics from 1215 for many centuries was how to restrain the executive government when despotically inclined. The answer may be found in one word, Parliament; the Great Council of the nation learned how to control the king. In Sir John Seeley's phrase a government-controlling organ was established alongside of a governing organ. This process, begun perhaps in the 13th century, was not completed, even in theory, till the Revolution Settlement of 1689, and in practice not till long afterwards.

Checks upon Parliament

All the attempted solutions above discussed may be described as varieties of what Montesquieu has made widely known as "The division or separation of powers." Safety for the governed was thus to be found in the multiplication and rivalry of the rulers. But, when the Parliament (or other legislative council) has triumphed over the executive, as is the case in most civilized countries to-day, the problem takes a completely different shape: How are we to restrain the despotism of Parliament? A mere enumeration of attempted answers must here suffice: (1) By splitting Parliament into at least two Houses, both of them effective realities, and placing obstacles in the path of rash and unconsidered legislation. (2) By limiting the scope of the law-making range of Parliament, as was done in regard to Congress by the framers of the American Constitution. (3) By some such device as the Referendum, which, in

Switzerland, confers on the mass of voters the right to veto all measures proposed by the legislature. (4) By means of a Federal system like that of the U.S.A., where the central Congress has to divide the sovereign legislative power not only with the president, but also with a series of local legislatures, one of which exists in each state of the Union.

Protecting the Minorities

The pressing form which this problem takes in democratic lands is that of affording adequate protection to the rights of minorities. A few, but only a few, of the powerful safeguards adopted in the American Commonwealth have been already indicated. The United Kingdom is entirely unprovided with any similar machinery or constitutional expedients. The "checks and balances" that once existed, as described by Walter Bagehot, have now ceased to act. In Great Britain all power has now been accumulated into the hands of the leading members of the Cabinet, who necessarily form also the leaders of the Parliamentary majority. Thus minorities, as far as constitutional safeguards go, continue to hold their rights on sufferance, by forbearance of the majority of a House of Commons, the membership of which changes at each successive general election. This danger to individual rights and liberties thus constitutes undoubtedly for the British Empire the most clamant problem of the present age.

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Poliziano, or **POLITIAN**, ANGELO (1454-1494). Italian poet and scholar. Born in Tuscany, at Monte Pulciano, July 14, 1454, he adopted the Latinised form of the name of his birthplace instead of his patronymic, Ambrogini.

Distinguished by his precocity in an age of precocious youth, he won the patronage of Lorenzo de' Medici, and became tutor to his children, and the most brilliant intellectual figure at the court of "the Mag-

nificent." The most remarkable classical scholar of the 15th century, Poliziano was as great in his Italian as in his Latin poems. His unfinished epic, *Giostra*, on a tournament



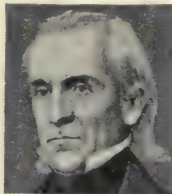
Angelo Poliziano,
Italian poet

in which Julian de' Medici was victor, has much inherent beauty, and is the first successful example in Italian literature of the use of the octave stanza later employed by Ariosto and Tasso. With his lyric play *Orfeo* (the story of Orpheus and Eurydice), he originated pastoral drama and opera in Italy. Poliziano died Sept. 24, 1494, two years after Lorenzo. See *Memoirs of Politianus*, W. P. Greswell, 2nd ed. 1805; *Renaissance in Italy*, J. A. Symonds, 1897-1902.

Polk, JAMES KNOX (1795-1849). President of the U.S.A. Born in Mecklenburg county, N. Carolina, Nov. 2, 1795, of Scottish-Irish descent, his original name being Pollock, he was called to the bar in 1820. He practised at Columbia, Tennessee, but turned also to politics. In 1823 he was elected to the legislature of Tennessee, and in 1825 became a member of Congress. For eight years he was speaker of the House of Representatives, and from 1839-41 governor of Tennessee. In 1844, Polk, as the Democratic candidate, was elected president, his opponent

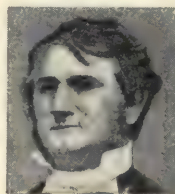
being Henry Clay. During his term the Mexican war took place, and the Oregon boundary dispute with Great Britain was settled. A reduced tariff system was introduced in 1846, and a bill passed for setting up an independent United States treasury. A bill to sanction the expenditure of large sums on internal improvements was vetoed by him. Polk died at Nashville, Tennessee, June 15, 1849. See *Life*, in *Presidents of the United States*, ed. J. G. Wilson, 1914.

Polk, LEONIDAS (1806-64). American soldier. Born at Raleigh, N. Carolina, April 10, 1806, he was



James K. Polk.

educated at West Point and entered the army. In 1831, however, he was ordained in the Episcopal Church, and in 1838 became a bishop in charge of an immense tract of country in the south of the U.S.A. On the outbreak of the Civil War in 1861 he returned



Leonidas Polk,
American soldier

to military life and was soon a major-general in the Confederate army. He held various commands with success, including that of a corps in the army of the Tennessee, until charged by Bragg with delay in attacking at Chickamauga. Jefferson Davis, however, exonerated him, and he was still in the field when he was killed, June 14, 1864. See *Leonidas Polk*, W. M. Polk, new ed. 1915.

Polka. Round dance said to have been invented about 1830 by a Bohemian servant girl. The name is probably derived from pulka (half), referring to the very short steps necessitated by the small dimensions of the room in which the inventor usually danced. In a few years the polka overran Europe, and its extraordinary popularity attained such a height as to become almost a mania, streets and public-houses being named after it. Its lively character and the simplicity of its steps no doubt conduced to this. Though now it has practically disappeared from the ballroom, it occasionally finds place at children's parties and informal gatherings. The music is in 2-4 time, the characteristic feature being the rest on the second beat.

The man begins with the left foot, his partner with the right. Three steps are danced forward, three back again, and then six turning round, after which the same order is resumed.

Poll (Mid. Eng. *pol*, back of the head). Taking of votes in order to ascertain the wishes of a majority of the people qualified to vote. The polling booth is the place where electors go to record their votes, and the polling day the day fixed for the voting. The announcement of the result is known as the declaration of the poll. (See *Election*; *Hustings*; *Vote*.)

The poll plays a part in English company law. Every company, by its charter or articles of association, provides a mode whereby shareholders may vote at company meetings. It is a common provision that votes shall be taken by

show of hands, but that if any shareholder, or a fixed number of shareholders, should be dissatisfied with the result of such a vote as announced by the chairman, a poll may be demanded. The manner of taking the poll depends entirely on the company's regulations. See *Company Law*.

Pollack (*Gadus pollachius*). Common British fish, belonging to the cod family and nearly related



Pollack, a British fish belonging to the cod family

to the coal fish. It is usually about 20 ins. long and is of a greenish colour, with a dark spot near the pectoral fin and no barbels. It occurs off the coasts of Cornwall and Devon, Norway, N. America, etc., and is valuable as a food fish and as a source of oil.

Pollaiuolo, ANTONIO (1429-98). Italian painter and craftsman. Born at Florence, he studied under



A. Pollaiuolo,
Italian painter

Bartoluccio, the goldsmith, and founded a prosperous school of painting, engraving, sculpture, and enamelling. In painting he was the foremost of the Florentine realists, insisting on anatomical truth at the expense of poetic sentiment; he often collaborated with his brother Piero. From 1489-96 he was in Rome, but died at Florence.

Pollanarua. Former name of an ancient capital of Ceylon. Topare (*q.v.*).

Pollard, ALBERT FREDERICK (b. 1869). British historian. Born at Ryde, Dec. 16, 1869, he was educated at Felsted and Jesus College, Oxford. Settling in London, he began to work as an assistant editor of *The Dictionary of National Biography*, was recognized as an authority on Tudor times, and in 1907 was made professor of English history at London University, and in 1908 fellow of All Souls College, Oxford. During the Great War his lectures and writings thereon were most careful and dispassionate utterances produced by the crisis, his historical sense being wonderfully acute, and his judgement rarely at fault. Pollard's works include *England under the*

Protector Somerset, 1900; Henry VIII, 1902 and 1913; Vol. VI of The Political History of England, 1910; The Reign of Henry VII, 1913-14; A Short History of the Great War, 1920. He contributes Parliament and several other articles to this encyclopedia. See portrait gallery of contributors.

Pollarding. Removal of all the branches at the head or poll of a tree, in order to induce the stem to throw out fresh branches. The custom is usually resorted to in districts where fuel is scarce. See Forestry.

Pollen (Lat., fine flour, mill-dust). Mealy substance, mostly yellow, which fills the anthers of flowering plants and grasses. The grains of which it is composed contain the male elements or nuclei, which fuse with the female element in the ovules enclosed in the carpels or ovary. This fusion brings about the formation of an embryo which, with its wrappings, constitutes the seed.

In plants that are pollinated by the wind the pollen grains are dry and light. Most forest trees are so pollinated, and the pollen may have to be carried a long distance by the wind. In other cases the pollen-grain is variously roughened that it may the more easily catch upon the hairy bodies of the in-

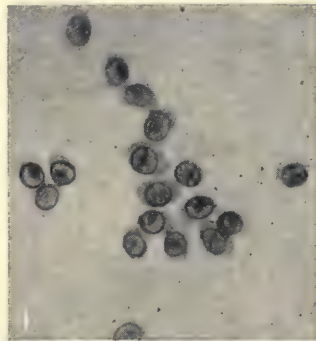
sects that act as pollen-carriers. In the orchids the pollen-grains have long threads which are united to form a stalk to the pollen-mass



A. J. H. Pollen,
British author
Hugh Cecil

Pollen, ARTHUR JOSEPH HUNGERFORD (b. 1866). British author. A son of John Hungerford Pollen, he was educated at the Oratory

(pollinium), which may be carried away bodily by attachment to the head of a visiting insect, so that it is placed on the stigma of the next orchid visited. See Bee; Flower.

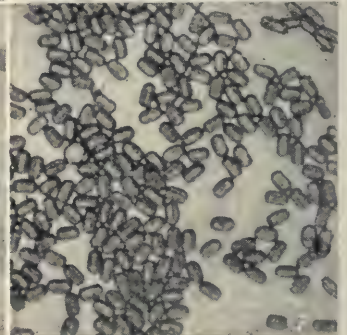
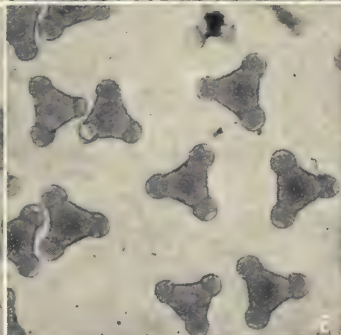
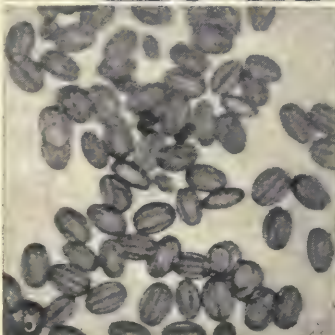
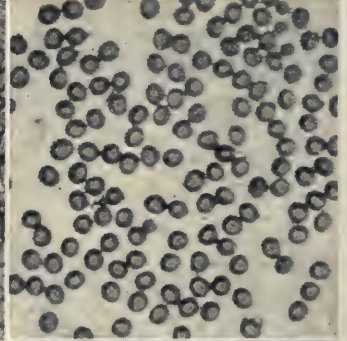
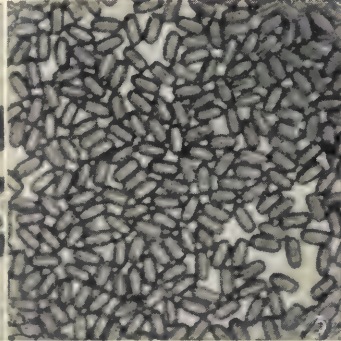
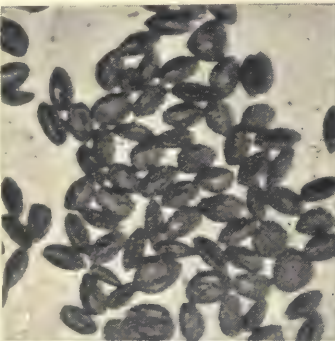


School, Birmingham, and at Trinity College, Oxford. He became a barrister, but, devoting himself largely to naval matters, was the pioneer of a system of fire control. He wrote extensively on the navy, and among his books are The Navy in Battle, 1918.

Pollenzo. Town of Italy, the ancient Pollentia. It stands on the Tanaro, 30 m. from Turin, and has remains of an aqueduct, amphitheatre, temples, etc. Here, in 403, Stilicho defeated Alaric and the Goths.

Pollination. Process antecedent to the fertilisation of the ovules of a flower, by which the pollen-grains produced in the anthers are brought to the stigma, where they are stimulated into activity and emit a long shoot which penetrates into the ovary and enters the ovules, thus effecting fertilisation.

In the simplest form of pollination, known as autogamy, or self-pollination, and found in many of the commonest weeds, the anthers are so situated in relation to the stigma that the pollen fertilises the ovules of the same flower. In the majority of plants, however, means, often elaborate, are taken to prevent self-pollination, and to obtain the aid of external agents in effecting cross-pollination. To this end



Pollen. Highly magnified specimens from British trees and plants. 1. Cedar of Lebanon, *Cedrus libani*, showing air-sacs. 2. Willow Herb, *Epilobium angustifolium*. 3. Lupin, *Lupinus*. 4. Thistle species. 5. Sage, *Salvia officinalis*. 6. Evening Primrose, *Oenothera biennis*. 7. Sweet Pea, *Lathyrus odoratus*. All are magnified 66 times except 3 and 5, which are magnified 100 times

the pollen may be rendered important as regards the ovules of the same flower; or the male organs (stamens) may be in separate flowers or on separate plants from those that bear the female organs (pistil). Or a species may bear on different individuals two or more forms of flowers (long-styled, short-styled, etc.), and the pollen of one form will be potent only in those of the other form. This is known as heterostylism, and is familiar in the flowers of the primrose and cowslip (pin-eyed and thrum-eyed).

In all the conifers and most of the British forest trees the sexes are on distinct trees (dioecious), and the pollen is carried from one to the other by the wind. This is a wasteful method, and many plants have improved upon it by enlisting the service of insects as carriers, attracting them to the flowers by conspicuous colouring, which is usually accompanied by the provision of nectar and often by seductive odours. It is easy to determine from the shape and colour of flowers what group of insects are invited to visit them; thus we can recognize bee-flowers, butterfly and moth-flowers, wasp-flowers, beetle and fly-flowers, and so forth. Fly-flowers are often noticeable from their dull purple-brown tints or their odour of carrion. In a few cases small birds, such as the humming birds, are the pollinating agents, and more rarely snails discharge this office. *See Botany; Clover; Flower; Plant.*

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Pollino, MONTE. Peak of the S. Apennines, Italy. It is situated on the borders of the provs. of Potenza and Calabria, 10 m. N.W. of Castro Villari, and reaches an alt. of 7,325 ft.

Pollio, GAIVS ASINIUS (75 B.C.-A.D. 6). Roman soldier and man of letters. He first became prominent by attacking Cato for his violent action on behalf of the senate, and attached himself to Julius Caesar, with whom he served in Gaul and with whom he crossed the Rubicon. He fought in Epirus, was present at Pharsalus, and held military appointments in Africa and Spain. He espoused the cause of Antony, negotiated the terms between

Antony and Augustus, and finally became an adherent and personal friend of Augustus. Even during his active career he achieved distinction as an orator and poet, and in his later years he devoted himself to literary pursuits, writing a history of the civil war, unfortunately lost. Pollio was the first to set up a public library at Rome, where he was a popular figure in society, and an admired friend of Horace and of Virgil, who dedicated his fourth Eclogue to him.

Pollock, SIR ERNEST MURRAY (b. 1861). British lawyer. Born Nov. 25, 1861, he was educated at Charterhouse and Cambridge, being called to the bar in 1885. Elected M.P. for Warwick and Leamington in 1910, he was recorder of Kingston-upon-Thames, 1911-19. During the Great War he was chairman of the contraband committee, Nov., 1915, and controller of the foreign trade depart., 1917-19. Attorney-general, Mar.-Oct., 1922, he was created a baronet, 1922.

Pollock, SIR FREDERICK (b. 1845). British jurist. The eldest son of Sir W. F. Pollock, Bart., he belonged to the distinguished family of that name. Born in London, Dec. 10, 1845, he was educated at Eton and Trinity College, Cambridge, and became a barrister in

1871. In 1882 he was appointed professor of jurisprudence at University College, London, and from 1884-1903 was Corpus professor of jurisprudence at Oxford. From 1884-90 he was professor of common law to the Inns of Court, and he edited *The Law Quarterly Review* and *The Law Reports*. In 1888 he succeeded to the baronetcy, and in 1911 was made a privy councillor. His many honours include a fellowship of the British Academy, and his works, *Principles of Contract*, 1911, and *Essays in Jurisprudence and Ethics*, 1882. With F. W. Maitland he wrote the standard *History of English Law*, 1895.

Pollock, SIR GEORGE (1786-1872). British soldier. Born June 4, 1786, son of David Pollock,

saddler to George III, he entered the army of the East India Company in 1803, and served in the campaign against Holkar, 1804-5, the Nepal Campaign, 1814, and the first Burmese War, 1824-26. In the expedition for the relief of Jalalabad he



Sir George Pollock, British soldier

fought his way through the Khyber Pass, relieved Sir Robert Sale, and reached Kabul, and was rewarded with the G.C.B. Returning to England, 1846, he became a director of the East India Co., was made a field-marshal in 1870, and a baronet in 1872. He died Oct. 6, 1872.

Pollock, WALTER HERRIES (b. 1850). British author and journalist. Born Feb. 21, 1850, second son of Sir W. F. Pollock, Bart., (d. 1888) he was educated at Eton and Trinity College, Cambridge, and was called to the bar at the Inner Temple in 1874. He edited *The Saturday Review*, 1883-94; wrote *The Modern French Theatre*, 1878; *Fencing*, in the *Badminton Library*, 1889; *Verse Old and New*, 1890; and collaborated with Sir Walter Besant in *The Ballad-monger*, a romantic play adapted from Banville's *Gringore*, produced at the Haymarket Theatre, Sept. 15, 1887.



Walter H. Pollock, British author
Russell

Pollokshaws. District of Glasgow, formerly a separate burgh. It stands on the White Cart, and has stations on the Glasgow and S.W. and Cal. Rlys., being also connected with the city proper by electric tramways. To the S.W. of Glasgow, it is mainly an industrial area. There is a town hall, and other public buildings include churches and schools. Having become an industrial centre, Pollokshaws was made a burgh in 1813. The name means the shaws or woods of Pollok. In 1912, having a pop. of about 13,000, it was absorbed into Glasgow. *See Glasgow.*

Pollokshields. District of Glasgow. It is S.W. of the city proper, and is served by the Glasgow and S.W. and Cal. Rlys., also by electric tramways. Chiefly a residential quarter, it was absorbed into Glasgow in 1891. Here is Maxwell Park. *See Glasgow.*



Sir Ernest Pollock, British lawyer
Russell



Sir F. Pollock, British jurist
Russell

Poll Tax. Tax on every poll or head, known also as a capitation tax. Such taxes have been used by various countries to raise money, and at the present day capitation taxes are in force in several states of the U.S.A. In England one was introduced in 1377, being a groat per head. In 1379 it was graduated from John of Gaunt, who paid ten marks, to payers of the groat. All over sixteen years old were liable.

It was levied again in 1380, but this led to the rising of the peasants, and it was given up. In 1513 there was a general poll tax, and there was another in 1641. During the reign of Charles II, revenue was raised in this way on at least three occasions, and from 1688 to 1698 there was a regular series of poll taxes, although the incidence of these varied from year to year. The last was the one of 1698. This was graduated; the very poor paid nothing, while the amount due from others varied from 1s. to 20s. See *Peasants' Revolt*; Tyler, Wat.; consult also *History of Taxation and Taxes in England*, S. Dowell, 1888.

Pollux. In Greek mythology, the twin brother of Castor. See Castor and Pollux.

Pollux. In astronomy, the popular name given to the star Beta Geminorum, in the constellation of the Twins. It is of 1.2 magnitude. See Castor.

Polo (Tibetan, *pulu*, ball). Polo is one of the most ancient games in the world. Cradled in Persia, it spread to India, and in slightly varying forms is found in China and Japan. A favourite sport of the Byzantine emperors, later it was revived in India, where it was taken up by British officers, and so spread over the world.

The first polo club in London was at Lillie Bridge, but the game really started when it was taken up by the Hurlingham Club. In 1874 the polo ground was made, a code of rules was laid down, and regular matches and tournaments were instituted. Other clubs were established at Ranelagh, Rugby, Roehampton, and elsewhere.

Polo grounds are of turf, carefully rolled and tended. The standard size is 300 yards by 160 yards. The shape should be an oblong, the long sides being guarded by planks 1 in. thick and 11 ins. high, 2 ins. being in the ground, so that the fence is 9 ins. on the outside. On the inside the turf should be raised and sloped along the boards, so that the ball striking the boards may not lodge under them. The ends are unboarded, and in the centre of each end are the goal posts, 24 ft. apart.

Polo balls are now made of willow root in England, and are 3½ ins. in diameter. The weight must not exceed 5 ounces. In India the polo grounds are as a rule unboarded, and the balls made of bamboo root. The polo stick is the same everywhere, and is made of the best Singapore canes fixed at a slight angle into heads, which in England are of willow or ash, and in India of bamboo. In India the heads of the sticks are round, and much the shape of a manila cheroot, but in England a square mallet head is preferred. The handle should be shaped like the handle of a racquet, but with a rubber grip and tape wrist-loop. The beginner should have a 53-in. cane, with an 8-in. head, weight about 6 oz., but experience will teach each player what length and weight suit him best.

Selection of Ponies

On the choice of a pony depends the whole future of the player. The polo pony may be of any height up to 15 hands, but about 14 to 14½ is the best height. Polo ponies in use at present include polo-bred ponies, i.e. those whose sires and dams are registered in the National Pony Stud Book. These ponies are bred for the game; they must be well balanced, fast, and quick to spring into their stride, handy to turn, and well trained. They must have courage. Speaking generally, the best ponies are those which on a foundation of native British pony stock have grafted thoroughbred or Arab blood. There are also Argentine ponies, Walers or New Zealand ponies, pure Arabs, and American ponies, and these are serviceable at polo in the order named. The modern game is played at a high rate of speed, and it takes a good pony to play three or four periods, the average time of a period being seven minutes.

Polo looks a rather dangerous game, but great care is taken to reduce the perils. Two umpires are appointed: in the case of Hurlingham and Ranelagh, club officials, whose duties are similar to those of the football referee, to stop dangerous or unfair play, and to inflict the penalties, generally a free-hit at the goal of the offending side.

Positions of the Players

Polo is played with four players a side. No. 1 and No. 2 are forwards. No. 3 is generally the best player in the team, and plays forward or back as the game requires. No. 4 is back, his primary duty being to defend his goal, and to pass the ball to No. 3, who in his turn tries to serve the ball up to his forwards in attack. In defence it is the duty of every man

to ride the corresponding man on the other side off the ball. Thus No. 1 tries to hinder or take the ball from No. 4 on the opposite side, No. 2 from No. 3, and so on. There is no offside at polo. Every player when qualified receives a handicap number, which is supposed to represent his value to a team in terms of goals. This handicap is not based on the player's individual score of goals, but on the extent to which the handicappers consider he helps his side to score. The team at polo is everything, the individual player of small account. Indeed, players who seek for applause by making brilliant strokes or "gallery play" are not in favour with the captains of the teams. The highest handicap at present is 10, and the lowest 1. The largest number of players is handicapped by the county polo association, which handicaps about 1,400 players.

The governing body of polo is the Hurlingham club polo committee, including representatives of army and county polo and of the leading polo clubs. Indian polo players are also represented on the Hurlingham committee, which makes and revises rules, issues challenges for international matches, handicaps the London players, and selected the team to meet the American team. As the result of the international match in 1914, Lord Wimborne's team brought back the cup from America, and in 1921 an American team came to England and regained it.

T. F. Dale

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Polo, MARCO (c. 1254-1324). Venetian traveller.



Marco Polo,
Venetian traveller
From old engraving

Born of noble parentage, he accompanied his father and uncle in 1271 to China, which the two elders had already visited about 1260. Crossing Persia, Western Asia, and Tartary, through districts unknown to Europeans until modern times, the three Italians crossed the Gobi desert, and eventually reached the city of Shang-tu in 1257. Here they saw the Great Khan, who conceived a liking for



1. Meadowbrook club (U.S.A.) v. Hurlingham, at Hurlingham, 1921. 2. Player in match (1) riding off an opponent. 3. America's final trial match at Ranelagh, 1921. 4. England v. America, at Hurlingham, 1921; Major

Lockett leading off Watson Webb. 5. Oxford v. Cambridge, at Hurlingham, 1921. 6. Old Rugbeians v. Old Etonians, at Roehampton, 1921. 7. England v. Ranelagh, at Ranelagh, 1921. 8. Oxford v. Cambridge, at Hurlingham, 1921

POLO: SOME NOTABLE GAMES IN PROGRESS ON ENGLISH GROUNDS

Marco, conferred dignities upon him, and even appointed him to an administrative post.

For three years Marco was governor of the city of Yangchow; he was employed in various political missions to India and to other parts of China. The khan was loth to let his visitors go when they expressed a wish to return to Europe, but in 1292 he permitted them to accompany an embassy to Persia, to conduct a Mongol princess as a bride to the shah. During the two years occupied in

cient quantity to make a determination of its atomic weight or spectrum possible. *See Radium.*

Polonius. Character in Shakespeare's Hamlet, famous for the rules of conduct which he gives to his son Laertes and to his daughter Ophelia. Counsellor of King Claudius, he fails to convince him that disappointed love for Ophelia is the cause of Hamlet's mental disturbance, and, setting himself to spy on the queen and the prince at their interview after the performance of The Mouse-Trap, he is killed by Hamlet, who mistakes him for the king. *See Hamlet.*

Polotsk. Town of W. Russia. It is in the govt., and 60 m. N.W., of Vitebsk, at the confluence of the Dvina and Polota, and a rly. junction half way between Dvinsk and Vitebsk. A very old town, it was once the capital of an independent principality. At the first partition of Poland in 1772 it was allotted to Russia. The old Kremlin encloses the Greek Catholic cathedral of S. Sophia. The town was captured by the Germans in March, 1918. Pop. 31,000.

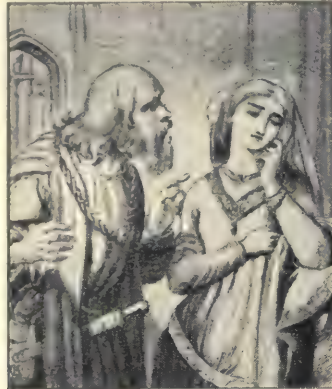
Polperro. Fishing village of Cornwall, England. On the S. coast, 13 m. from Bodmin, it occupies a picturesque position in a valley and is of special interest to geologists. The chief industry is the pilchard fishery. Polperro has a small harbour, and here is a coast-guard station. Formerly it was a market town.

Poltava OR PULTAVA. Govt. of S.W. Russia. It is bounded N. by Chernigov and Kursk, E. by Kharkov, S. by Kherson and Ekaterinoslav, and W. by Kiev. The country, watered by the Dnieper and its tributaries, is extremely fertile, being within the black earth wheat belt. The chief manufactures are flour, tobacco, spirits, and sugar. Its area is 19,265 sq. m. Pop. 3,716,000.

Poltava OR PULTAVA. Town of Russia, and capital of the govt. of the same name. It is 70 m. S.W. of Kharkov and stands at the junc-



Poltava, Russia. Memorial church on the battlefield, with grave of soldiers surmounted by a cross



Polonius and his daughter Ophelia. From an illustration to Hamlet by H. C. Selous

reaching their destination, many of the retinue perished. Largely owing to the care of the Venetians the girl survived, and was duly handed to her bridegroom. The Polos did not reach Venice until 1295. Three years later Marco, while fighting the Genoese, was taken prisoner, and during his confinement dictated an account in French to one of his fellow captives, Rusticiano of Pisa, who eventually published it as The Book of Marco Polo, which has been translated into many languages. Polo made his will, preserved in S. Mark's library, Jan. 9, 1324, and died probably in the same year. *See Travels of Marco Polo*, ed. T. Wright, 1899.

Polonaise (Fr., Polish). State-ly Polish national dance in three-four time. It has a strong accent on the first beat of the bar, whereas the Mazurka has the accent on the second beat. Its closing cadence represents the final courtly bow. It was idealised by Chopin, whose Polonaises are, however, too complex to convey the impression of the real dance. *See Dancing.*

Polonium. Radioactive substance discovered by Pierre and Marie Curie in 1898. It is a product of radium emanation, and is also known as radium F. Polonium has not yet been obtained pure in suffi-

tion of the Poltavka and the Vorskla, and is a rly. junction on the Kharkov-Nikolaiev rly. Its chief industries are the making of tobacco, candles, soap, and leather. Pop. 84,000. Peter the Great's signal victory over the Swedes in 1709 is commemorated by a memorial stone set up in the town in 1849 and tumuli on the battlefield, 3 m. to the N.W.

Poltava was captured by the Germans in March, 1918, and was prominent in the anti-Bolshevist campaigns of 1919, being captured by Denikin (q.v.) in that year.

Poltava, BATTLE OF. Fought July 8, 1709, between the Swedish army of Charles XII and the Russians under Peter the Great. In spite of unbroken success, Charles's army was reduced to an efficient force of 20,000 men, chiefly cavalry, the powder had deteriorated, and communications with Sweden were cut off. Poland being as yet



Polperro, Cornwall. Town and harbour looking inland

unable to help, the king could only rely upon the Tartars, Zaporogian Cossacks, and Wallachians, and while awaiting their arrival laid siege to Poltava in May. A Russian relief force captured the Zaporogian camp and entrenched itself behind the river Vorskla. Charles having been incapacitated by a wound, Marshal Rehnskjöld succeeded in the command of the Swedish army, and on July 8 (N.S.) attacked the lines of the

Russians, who outnumbered the Swedes by four to one. At first the Swedes were victorious on both wings, but Peter counter-attacked and enveloped them. With the help of a new gun he annihilated the Swedish infantry. *See* Charles XII.

Poltergeist (Ger., noisy ghost). In spiritualism, name given to the supposed agent of inexplicable occurrences in a house, e.g. the rattling of crockery, moving of furniture, etc. The phenomena referred to have been common since ancient times in most parts of the world. In a number of cases—e.g. at Woodstock in 1649, described in H. More's *Continuation of Glanvil's Collection of Relations in Proof of Witchcraft*; at Tedworth, dealt with in Joseph Glanvil's *Sadducismus Triumphatus*; and the Cock Lane Ghost, successfully laid by Dr. Johnson and his friends—the apparent mystery has been proved to be the result of human agency, a cleverly managed trick. But, as the inquiries of the Psychical Research Society seem to show, some occurrences permit, if they do not compel, even the frankly sceptical to keep an open mind on the subject of the doings of the poltergeist. *See* Cock Lane; Demonology; Haunted Houses; Witchcraft; consult also *Proceedings of the Psychical Research Society*.

Polwarth, BARON. Scottish title borne since 1690 by the families of Hume, or Home, and Scott. Sir Patrick Hume (1641–1724), a member of the family to which the earl of Home belongs, was lord chancellor of Scotland. His father, Sir Patrick, had been made a baronet, and he himself was created baron in 1690 and earl of Marchmont in 1697. His son Alexander became the 2nd earl, but in 1793 the earldom became extinct.

The barony of Polwarth passed to a daughter and then to an aunt of the late earl. The daughter, Diana, married Walter Scott of Harden, and their son, Hugh Hepburne-Scott, was allowed to take the barony in 1835. He ranked as the 4th baron, and from him the present baron is descended. Walter Hugh, the 6th baron, became chairman of the prison commission of Scotland in 1909. The family seat is Harden, Roxburghshire. Polwarth itself is a village in Berwickshire, 4 m. from Duns. *See* Home, Earl of; Marchmont, Earl of.

Polyaenus (2nd century A.D.). Greek rhetorician and advocate. A native of Macedonia, he settled at Rome during the reign of Marcus Aurelius, for whose benefit he compiled a work called *Strategemata* (military stratagems) at the be-

ginning of the campaign against the Parthians (162–165). Originally consisting of eight books, six of which are extant in a complete state, it contains not only examples of military strategy, but of astuteness displayed in other branches of life. He also wrote on Thebes and Macedonia.

Polyandry (Gr. *polys*, many; *andres*, males). Plurality of husbands. Usually deemed to arise from a paucity of women, especially in mountainous, insular, or sterile regions, it is often associated with food-scarcity and girl-infanticide. Its antithesis is polygyny. In the fraternal form, a man's brothers share his marital rights, as among the agricultural Tibetans and Todas. The non-fraternal form among the Nayars of India, and in the Marquesas islands, is scarcely distinguishable from communal marriage. *See* Marriage; Polygamy; Society.

Polyanthus (Gr. *polys*, many; *anthos*, flower). Garden hybrid originally derived from crossing the



Polyanthus. Flowers, leaves, and buds of the hybrid garden plant

cowslip (*Primula veris*) and the primrose (*P. acaulis*). By selection and further crossing an almost endless variety of form and colour has been raised by florists.

Polybius (c. 210–120 B.C.). Greek historian. He was born in Megalopolis in Arcadia, and his father was one of the leaders of the Achaean League at a time when it was endeavouring to resist the inevitable dominion of Rome. Deported to Italy after the conquest of Macedonia, Polybius had the good fortune to be received in the household of Aemilius Paulus, with whose son, the younger Scipio, he formed a life-long friendship. Polybius was with Scipio at the destruction of Carthage in 146 B.C. The same year saw him in Greece, and when the inevitable defeat took place Polybius set himself to secure the most favourable terms for his countrymen. So successful were his efforts that statues were erected in his honour

in several of the cities of Greece. Already Polybius had begun to collect materials for his great work, a history of Rome from 221–146.

Of the 40 books of the history, only the first five survive, but these and fragments of the lost books make it clear that the general thesis of the work was to show that the passing of dominion into the hands of the Romans was inevitable, because they were more fitted to rule than the nations they conquered. Polybius is no stylist, yet he ranks high as an historian. *See* Greek Literature; consult also *The Ancient Greek Historians*, J. B. Bury, 1909.

Polycarp (c. 69–155). Apostolic father and saint. Born about A.D. 69, he is said to have become a Christian about the year 80. According to Irenaeus, he was a disciple and friend of S. John, who is said to have consecrated him bishop of Smyrna about the year 96. It is supposed that he was the angel of the Church in Smyrna (Rev. ii, 8). One of his pupils was Irenaeus. Polycarp was the author of an Epistle to the Philippians, and about 155 went to Rome to confer with Pope Anicetus on the question of the date of the Easter festival and other matters of Church observance. Soon after his return to Smyrna he was apprehended in a local persecution of the Christians, and burnt at the stake.

Polyclitus (5th century B.C.). Greek sculptor. He was probably a native of Sicily, but was identified with the school of Argos, where he lived. One of the greatest artists of his time, his Doryphorus (spearman), of which there are copies at Rome, Florence, Naples, and Berlin, was, according to Pliny, the last word in perfect sculpture. Among his other works are the Diadumenus and the famous chryselephantine statue of the goddess Hera, once in the temple at Argos. Portraits, etc., by him have been discovered at Olympia, Delos, and Samos. There was also a younger Polyclitus, architect and sculptor, who flourished in the 4th century. *Pron.* Polly-cly-tus.

Polycrates (d. 522 B.C.). Tyrant of Samos. By creating a fleet, he extended his dominion to other islands and the coast of Asia Minor, and became exceedingly powerful and wealthy. His good fortune was so constant that Amasis, king of Egypt, who had entered into an alliance with him, became uneasy, thinking that such unvarying prosperity would eventually provoke the anger of the gods. According to Herodotus, Amasis asked his ally to throw away one of the most valued of his possessions. Polycrates threw a

beautiful ring into the sea, but the next day it was brought back to him by a fisherman, who had found it inside a fish which he had caught. Amasis was now certain that such luck could not possibly last, and broke off the alliance. Polycrates repelled the attacks of various enemies, but was finally decoyed to the Asiatic mainland by a Persian governor, and crucified.

Polygalaceae. Natural order of herbs and shrubs, natives of temperate and tropical regions.



Polygalaceae. Leaves and flower-spike and root of *P. senega*

They have chiefly alternate leaves (rarely opposite), and irregular flowers. They have bitter, emetic, and purgative properties, and *Polygala senega* and *Krameria triandra* are employed in medicine. See Milkwort; Rhatany.

Polygamy (Gr. *polys*, many; *gamos*, marriage). Term commonly used for a plurality of wives. Strictly speaking, however, this is polygyny, from Greek words meaning many women, and its converse is polyandry, having many husbands. Polygamy really includes the two, and its antithesis is monogamy. Highly developed in negro Africa, polygamy is well established in Australia and parts of Melanesia. It is of high antiquity among the Semites, by whom it was regulated in early times. It passed into Aryan India and was retained in Mahomedanism. Among many peoples, whose powerful and wealthy classes practise polygamy, marriage is normally monogamous for economic reasons. See Marriage; Society.

Polygenism (Gr. *polys*, many; *genos*, kind). Theory attributing to mankind descent from more than one original stock or pair. In one form it claims a separate ancestry for the main human races now extant, on the ground that their physical and mental differences are so fixed as not to be accounted for by the alternative view, called monogenism, of the unity of the human species. See Anthropology; Monogenism.

Polyglot (Gr. *polys*, many; *glotta*, a tongue). Term applied to any book containing, in addition to the original text, various translations of this text, arranged in parallel columns. The term, also used in reference to dictionaries in various languages, is especially applied to particular editions of the Bible.

Among polyglot Bibles are (1) The Complutensian, printed at Alcalá de Henares, Spain (the Roman *Complutum*), for Cardinal Ximenes, 1502-17, published in 6 vols., 1520, and containing Hebrew, Chaldee, Greek and Latin. (2) The Antwerp, or Biblia Regia, printed by C. Plantin, 8 vols., 1569-72, for Philip II under the supervision of B. A. Montanus and based largely on the Complutensian. (3) Paris, 10 vols., 1628-45. (4) London, or Walton's, 6 vols., 1654-57, ed. by Brian Walton, afterwards bishop of Chester, one set of which, 1657, was dedicated to Oliver Cromwell and known as the Republican; and the other to Charles II, 1660, called the Loyal. It contains Hebrew, Samaritan, Aramaic, Greek, Arabic, Chaldee, Ethiopic, Syriac, Persian, and Latin texts, all except the last named with literal Latin translations, and a Prolegomena by the editor. (5) Bagster's, in Hebrew, Greek, Latin, Syriac, German, Italian, French, Spanish and English, ed. S. Lee, with Prolegomena, 2nd ed. 1831. Among others is Bielefeld's, ed. R. Stier and C. G. W. Theile, 4 vols., 4th ed. 1875. In 1819 a Polyglot English Prayer Book was published by Bagster. See Origen.

Polygnotus (5th century B.C.). Greek painter. Born in Thasos, he was the son and pupil of the elder Aglaophon. He decorated the temples of the chief Greek cities with paintings of mythological subjects chosen from Homer's epics, and his idealistic and expressive style greatly raised the status of painting, hitherto subordinate to other arts. The Athenians gave him citizenship, and the Amphictyonic council decreed his maintenance, in Athens and other Hellenic cities, at the public expense. Pron. Poly-gno-tus.

Polygon (Gr. *polys*, many; *gōnia*, angle). In geometry, a closed figure bounded by straight lines. The triangle is the only polygon which is necessarily in one plane. Polygons which do not lie in one plane are called *gauche*, those in which all the angles are equal and the sides equal respectively, are said to be regular. See Geometry.

Polygonaceae. Natural order of herbs, shrubs, and a few trees, chiefly natives of temperate re-

gions. Forming the buckwheat family, they have alternate undivided leaves, whose margins are at first rolled back. The flowers are mostly small and inconspicuous, though sometimes rendered showy by association, as in rhubarb (*Rheum*). They have hard fruits with floury seeds, which in the case of the buckwheat (*Fagopyrum esculentum*) has caused them to be used as food. The order includes the docks and sorrels (*Rumex*) and rhubarb (*Rheum*). See Rhubarb.

Polygon Wood. Wood of Belgium in the prov. of W. Flanders. It is 4 m. E. of Ypres, and is so named because in its centre was once the racecourse (*polygone*) of Ypres. In the Great War it was fiercely contested by the British and Germans in Oct., 1914, and remained in the possession of the former until May, 1915. It was stormed by Australians, Sept. 26, 1917, the victory setting free two companies of Highland troops who had withstood German attacks for over 36 hours. Retaken by the Germans in April, 1918, the wood was finally cleared of the enemy by the Allies in Oct., 1918. An obelisk marks the Australian victory. See Ypres, Battles of.

Polyhedron (Gr. *polys*, many; *hedra*, base). In solid geometry, a solid completely bounded by plane surfaces. The bounding surfaces are polygons and are called faces, where they meet edges, and the points where the edges meet, vertices. When all the faces are equal, regular figures, the polygon is said to be regular. There are only five regular convex polyhedra, the tetrahedron, hexahedron, octahedron, dodecahedron, and icosahedron. See Geometry.

Polymerism. Form of isomerism (*q.v.*), defined as the power which certain chemical elements and compounds possess of condensing their molecules. The product is said to be a polymer or polymeric of the simpler substance. Examples in inorganic chemistry are oxygen and acetylene. In the former case the condensed oxygen molecule (O_3) is known as ozone, while acetylene passed through a red hot tube polymerises into benzene.

Polyneicês. In Greek legend, the son of Oedipus, king of Thebes. When Oedipus went into voluntary exile, it was agreed between his two sons, Polyneicês and Eteoclês, that each should rule by turn for terms of a year. Eteoclês had the first term, but at the end of it refused to give up the throne. Polyneicês took refuge in Argos, whence he organized and led the first expedition of the Seven against

Thebes, in the course of which the two brothers met in single combat and were both killed. Antigone had Polyneices' body buried with due honours, in defiance of the orders of the king of Thebes, and was put to death. See Antigone. *Pron.* Pollyn-nee-z.

Polynesia (Gr. *polys*, many; *nēsos*, island). Term applied to the most easterly of the islands of the Pacific Ocean. Their limits are approximately the tropics of Cancer and Capricorn on the N. and S. and meridian 180° on the W. Hawaii is in the track of the N.E. trade winds in summer and the S.W. winds in the winter; the islands S. of the equator are crossed by the S.E. trade winds. Except Hawaii, which are large volcanic islands fringed by coral reefs, they are small in size and, in many cases, coralline in formation. The volcanic islands are forested, but the others are rather bare. Coconuts are produced, and copra forms the chief article of island trade, which largely centres in Auckland and Sydney. Sugar and fruit are grown on the larger islands. Politically, the Hawaiian islands, S. Samoa, and the Baker and Howland islands belong to the U.S.A.; the Society and Tubuai groups, and the E. Marquesas are French; N.W. Samoa is under the mandate of New Zealand; Fiji, the Phoenix, and Tokelau or Union groups are British; and the Hervey or Cook and the Manahiki islands are dependencies of New Zealand. See Pacific Ocean.

Polynesian. Term denoting the aboriginal population of the Pacific islands S. and E. of the Micronesian and Melanesian groups. Estimated at 200,000, their ambit lies within a triangle whose corners are New Zealand, Hawaii, and Easter Island, including the Tonga, Samoa, Cook, Tahiti, Paumotu, and Marquesas archipelagos.

Native traditions point to a migration from the Ganges basin, after 450 B.C., of a caucasoid people who, reaching Java shortly before our era, acquired seaman-ship, and replaced rice by bread fruit in their dietary. By A.D. 450 they were established in Samoa, two centuries later in Hawaii and the Marquesas, and by 850 in Tahiti and New Zealand, although the present Maoris did not arrive until 1350. These migrations occurred in double canoes and single outriggers, with triangular mat-sails. Melanesian and other elements, ancient and recent, are discernible, the result of ethnic and cultural admixture with previous comers. These predominate in Fiji, which subsequently experi-

enced Polynesian influence from the Tonga or Friendly Islands.

Polynesians are usually lithe and active, averaging 5 ft. 8 ins. in height; olive-brown and longish-headed, they have oval faces and wavy hair, and are cheerful and dignified. Megalithic monuments here and there denote independent streams of influence. Hunting and the bow-and-arrow necessarily fell into disuse, but fishing was highly developed. Cannibalism and infanticide formerly prevailed. The staple foods are taro root, sweet potato, yam, coconut, bread fruit, and banana. Pottery, unknown except through Fijian contact in Tonga, was replaced by gourds and carved wood bowls, cooking being effected by hot stones. In the absence of metals, implements were of shell, wood, or stone. Bark-cloth, tapa, was made from the paper-mulberry, and mats from plaited strips of pandanus and other leaves. Featherwork excelled in Hawaii. Tattooing of the limbs of both sexes was formerly effected by bone implements with serrated edges. In the Tonga group nose-flattening was practised.

Society was based upon noble, free, and servile classes, the last representing the indigenous populations. The prerogatives of the nobles were guarded by a taboo system, maintained by a priesthood, which also practised divination and ordeals. Pantomimic dancing survives in such forms as the Samoan siwa, or sitting dance, and the Hawaiian hula. The copious mythology includes tales of cosmic deities and culture-heroes, with creation legends emanating from the Indian cradleland. The Polynesian dialects form a sub-family of the Austronesian division of the Austic family of languages. A Pan-Pacific congress met at Honolulu in 1920, to plan a systematic inquiry into the origin, migrations, and culture of the Polynesian peoples. See Areois; Ethnology; Kanaka; Maori; Taboo; consult also Maori and Polynesian, G. M. Brown, 1907; Hawaiki, S. P. Smith, 3rd ed. 1910; The Islanders of the Pacific, T. R. St. Johnston, 1921.

Polyp (Fr. *poulpe*, octopus). Name vaguely applied to an animal of the phylum Coelenterata (*q.v.*). It takes the form of a hollow tube-like bag containing only one internal body cavity or set of cavities, which communicates with the exterior only by the mouth. The common hydra (*q.v.*) of British ponds is a familiar example.

Polyperchon or POLYSPERCHON. One of the generals of Philip of Macedon and Alexander the Great.

Nominated governor of the Macedonian empire by Antipater, 319, he found himself opposed by the latter's son Cassander, and others. Twice obliged to leave Macedonia, Polyperchon attempted to form an independent kingdom in Peloponnesus. Having espoused the cause of Heracles, the son of Alexander, he afterwards put him to death at the instigation of Cassander, who entered into negotiations with him. Cassander afterwards failed to carry out the terms of the agreement, and Polyperchon, his reputation ruined by the murder of Heracles, spent the remainder of his life in Locris.

Polyphase. In electricity, term applied to alternating electric currents, in which two or more phases overlap. A single-phase generator sends out periodic pulsations of current, which reverse their character every half period. Represented graphically, the current appears as a sinuous line repeatedly crossing a zero line, the "waves" on both sides having the same shape. Twice every alternation the current-flow in the circuit is at zero.

A polyphase generator is so wound that it is in effect two or more generators combined, all producing alternate currents of the same periodicity or frequency, but out of step with one another. A three-phase alternator, for example, sends out three distinct series of pulsations into three separate conductors, A, B, C, each carrying a single-phase current. The crests of the waves in B and C are formed respectively one-third and two-thirds of a period after those in A. Consequently a motor suitably wound to use the current of the three conductors will run very steadily, being, in effect, three motors with armatures assisting one another to pass the no-flow points. Two-phase and three-phase currents are most widely employed in the distribution of electrical power.

Polyphemus. In Greek mythology, one of the Cyclopes, a race of giants. The son of Poseidon and Thoësa, daughter of the sea-deity Phoreys, he dwelt on the coast of Trinacria (Sicily), where he kept his flocks. In the course of his wanderings, Odysseus and his comrades sought refuge in the cave of Polyphemus, who killed and ate some of the companions of the hero. When the giant had gone to sleep, however, Odysseus destroyed the sight of his one eye by piercing it with a burning pole, and escaped from the cave with the remainder of his comrades. See Cyclopes.

Polyphony (Gr. *polys*, many; *phōnē*, sound). Style of music in which the constituent voices or instruments pursue their own individual courses and preserve a distinct melodic interest. It thus differs from the monodic or homophonic style, in which most of the parts are simply accompanimental to the principal melody. A fugue or a canon is necessarily polyphonic; other forms of music may or may not be so, according to the desire of the composer. See Harmony; Music.

Polypodiaceae. An extensive natural order of Pteridophytes. It includes the greater number of fern-genera, and is of world-wide representation. With few exceptions they are perennial herbs with leaves or fronds of a tough texture, simple, or more or less divided. The spores are borne in minute stalked capsules, partially girt by a vertical ring. These are clustered in dots or lines on the back of the frond. The frond before expansion is rolled up with the tip in the centre of the coil.

Polypody (*Polypodium vulgare*). Fern of the natural order Polypodiaceae. A native of Europe and the N. temperate zone, it has a fleshy rootstock, with a furry coat of pale brown lance-shaped scales, which creeps on the surface of tree-trunks, walls, and hedge-bottoms. The leathery fronds are cut into lobes from the sides, and their stalks are jointed to the rootstock in such a way that they can be thrown off when old. They are produced singly at short intervals along the rootstock, and remain fresh and green throughout the winter. The golden-orange clusters of spore-cases are produced in double rows on the back of the lobes. The rootstock was formerly employed as a purgative and for whooping cough. See Fern.

Polyporus. Large genus of fungi of the natural order Hymenomycetaceae. It has spores borne in minute tubes which are sunk into the underside of the cap



Polyporus. Dryad's Saddle, *P. squamosus*, a bracket-shaped species on a tree-trunk



Polytechnic Institute at Battersea, London, opened Feb. 24, 1894, on the site of the old Albert Palace. Top, Regent Street Polytechnic

or pileus. The substance of the pileus is corky or woody. They mostly grow upon living or dead wood—trunks, branches, or roots of standing trees or worked wood. Those that grow from the trunks usually take the form of brackets. These are only one phase of the plant's growth. The vegetative phase takes the form of delicate threads (mycelium) permeating the tissues of the wood and destroying them. Many of the species are highly destructive to growing timber. See Forestry.

Polypterus. Genus of mud-fishes, found in the rivers of Africa. The dorsal fin is broken up into a series of small finlets arranged in a row along the back, and the body is covered with large plate-like scales. It grows to a length of about four ft., is carnivorous in diet and nocturnal in habit. See Fish.

Polypus. Tumour growing from mucous membrane, usually more or less pear-shaped, and at-

tached by a stalk to the surface from which it grows. It consists of fibrous tissue covered with epithelium, and is inflammatory in origin. Polypi are most frequently met with in the nose, bladder, rectum, or uterus. They rarely become malignant, i.e. cancerous in nature. If the growth is accessible, it is as a rule easily removed.

Polytechnic (Gr. *polys*, many; *technē*, art). Term applied to any institution affording practical training in the arts and sciences. Such institutions are known also as technical high schools. The term was first used in connexion with the École Centrale des Travaux Publics, established in Paris by the National Convention in 1794, and known since Sept., 1795, as L'École Polytechnique. Frequently reorganized, it has been ever since devoted to engineering. The first London polytechnic, the Royal Polytechnic Institution, 309, Regent Street, and 5, Cavendish

Square, opened Aug. 6, 1839, was devoted to the exhibition of new inventions and lectures, a popular feature being a diving-bell. In 1881 the premises became the home of the Polytechnic Young Men's Christian Institute, founded by Quintin Hogg (q.v.). Now known as the Regent Street Polytechnic, its educational courses and equipment receive material aid from the technical education board of the L.C.C. and the city parochial charities.

The work carried on by means of day as well as evening classes at these polytechnics embraces both theoretical and practical training in class-rooms and laboratories, while at most of them is a depart-



Polypterus, the African mud-fish, showing dorsal fin broken into small finlets

ment for the teaching of domestic economy to girls and women. Similar institutions exist in other

large cities of the United Kingdom, in Germany, Austria, Switzerland (that at Zürich, 1861-64, being the seat of Zürich University), and the U.S.A., where the parent foundations, the Rensselaer Polytechnic Institute, Troy, and Franklin Institute, Philadelphia, date from 1824. See Technical Education; consult also *Histoire de L'École Polytechnique*, G. Pinet, 1886.

Polytheism (Gr. *polys*, many; *theos*, god). Belief in, and worship of, many gods. Opinion is divided on the question whether polytheism preceded, or was a degradation of, monotheism. It figured in the ancient history of the Hebrews, characterised the religions of Assyria, Babylonia, Egypt, Greece, and Rome, and affected the pantheism of India. See Anthropomorphism; Deism; Monotheism; Paganism; Pantheism; Religion.

Polyuria. Increase in the amount of urine passed. It may be due to natural physiological processes, e.g. increase in the amount of food and liquid taken; to exposure to cold, which reduces transpiration by the skin; or to disease, most frequently diabetes and Bright's disease.

Polyxena. In Greek legend, the daughter of Priam, king of Troy, and beloved of Achilles. After the taking of Troy, Polyxena was taken captive by Neoptolemus, the son of Achilles, and when on the return journey, on the Thracian coast, the shade of Achilles appeared, and demanded that Polyxena should be sacrificed to him, Neoptolemus immolated the unfortunate maiden. The incident is treated in the *Hecuba* of Euripides. *Pron.* Pollicks-in-a.

Polyzoa (Gr. *polys*, many; *zōon*, animal). Name applied to a zoological phylum of minute animals, mostly marine, which live in colonies. The sea-mats, common on sandy shores and often mistaken for sea-weeds, are familiar examples. The colonies assume many forms, some being tree-like, others leaf-like, while others form incrustations on rocks and sea-weeds. The animal is of simple structure, consisting mainly of a U-shaped alimentary canal, terminating in a mouth and an anus placed near together. The mouth is surrounded by a ring or horse-shoe of tentacles, covered with minute cilia, the waving of which causes currents in the water and so sweeps particles of food into the mouth. In these colonies the individuals are specialised to perform various functions for the common benefit, some being feeding agents, some reproductive, and others being armed.

Pomade (Lat. *pomum*, apple) OR POMATUM. Name given to any scented grease or ointment used for the hair and skin. It was formerly made from the juice of apples.

Pomander (Fr. *pomme d'ambre*, amber apple). Scented ball or box hung at the end of the girdle, round the neck, or carried in the pocket. Pomanders became obsolete at the end of the 17th century.

Pombal, SEBASTIÃO JOSÉ DE CARVALHO E MELLO, MARQUESS OF (1699-1782). Portuguese statesman.



Marquess of Pombal, Portuguese statesman

Born at Lisbon, May 13, 1699, of good family, he became Portuguese ambassador in London, 1739-45, and Vienna, 1745-49. Recalled to Lisbon, he became principal minister of Joseph I, Aug., 1750, carrying out many internal reforms, and strengthening the position of Portugal abroad. He crushed a revolutionary plot among the nobles and Jesuits in 1759, and in the same year expelled the Jesuits from Portugal and her colonies. On the accession, in 1777, of Queen Maria, he resigned his offices. Much of his action was reversed, and he himself was severely censured and banished from the court. He died at Pombal, May 8, 1782.

Pome (Lat. *pomum*, apple). In botany, a succulent fruit with a fleshy body, such as that of the apple, pear, etc., the seeds of



Pomegranate. Flower, leaves, fruit, and fruit shown in section

which are enclosed in carpels forming the core. See Fruit.

Pomegranate (*Punica granatum*). Tree of the natural order Lythraceae, native of W. Asia. The leaves are oblong or lance-shaped, and the red flowers are in small clusters at the ends of the branches. The large fruits, golden tinged with red, are remarkable in their structure, there being two series of car-

pels, one above the other. The seeds are coated with sweet, juicy pulp. The rind is used for tanning morocco leather.

Pomerania. Dist. of Prussia, Germany, once a separate duchy. The present province, which is not coterminous with the old duchy, has an area of 11,630 sq. m. and a pop. of 1,700,000. It extends along the shores of the Baltic between Mecklenburg and Poland, and is divided into three parts, the districts of Stralsund, Stettin, and Königsberg. The islands of Rügen, Wollin, and Usedom lie off the coast. Remarkable for the number of its lakes, Pomerania's chief rivers are the Oder and its tributaries. Barley, rye, and other cereals are grown, and sheep reared.

Pomerania was inhabited about the 8th century by people of Slavonic race, and about 1200 their rulers called themselves dukes. It became part of the German kingdom, and at one time included Pomerellen, the modern province of West Prussia. This, however, was separated from Pomerania proper about 1300. The dukes of Pomerania divided and subdivided their lands to provide for various branches of the ducal family. In 1625, however, it was united under a single duke, and in 1637, on his death without sons, it was claimed by Brandenburg, in accordance with a treaty made some years before. The Swedes, however, were in possession, for the Thirty Years' War was raging, so in 1648 it was divided; Brandenburg secured eastern, and Sweden western, Pomerania. The rulers of Brandenburg lost no chance of claiming the whole, and in 1720 most of Western Pomerania was handed over by Sweden. In 1815 the rest also became part of Prussia. See Prussia.

Pomeranian Dog. Breed of pet dog. It is bred largely in Germany, where it is known as the Spitz and is claimed as one of the national breeds. In general appearance the Pomeranian recalls a diminutive



Pomeranian Dog. Champion specimen of the breed

chow or Eskimo dog, and is doubtless descended from one or more of the Arctic breeds. In its original and large form, a breeds now little known, the Pomeranian was used as a wolf dog. It has been used abroad as a sheep dog, but in Great Britain only the diminutive type, bred by special selection, is seen, kept as a ladies' pet in spite of its rather uncertain temper and uselessness as a house dog. Specimens weigh 8 lb. and less; the favourite colour is black, but white and fawn are sometimes seen; the ears should be erect, with no tendency to curl at the tips. See Dog, col. plate.

Pomeroiy, FREDERICK WILLIAM (d. 1924). British sculptor. He entered the R.A. schools, 1881,



F. W. Pomeroiy,
British sculptor

gaining a gold medal and travelling studentships four years later, and medals at Paris and Chicago. Notable examples of his work are the statues of Burns at Paisley, and Sydney, N.S.W.; of Gladstone, in the Houses of Parliament; and the monument to Lord Dufferin and Ava, at Belfast. He was made R.A. in 1917, and died May 26, 1924.

Pomeroiy Bullet. Incendiary projectile for use from machine guns. Named after its inventor, J. Pomeroiy, an engineer of Canadian extraction, it was adopted for the use of the British air service during the Great War, and proved most effective in combating Zeppelins and other aircraft. The mixture in the bullet ignited on impact of the projectile and burned with sufficient intensity to ignite the hydrogen escaping from the punctures made in the envelope of the balloons, rendering their total destruction certain. See Zeppelin.

Pomona. In Roman mythology, a nymph or goddess who was the patroness of gardens and fruit.

Pomona OR MAINLAND. Largest of the Orkney Islands, Scotland. Its area is 160 sq. m. It is divided into two unequal portions by Kirkwall Bay and Scapa Flow (q.v.), and has a steep rocky W. coast, with a few good harbours. The surface is mainly moorland and heath, with some fertile valleys. Kirkwall and Stromness are the only towns. "Maes Howe," a chambered barrow, and the Standing Stones of Stenness, a group of stone circles, are interesting antiquities. Pop. 15,000.

Pomona. City of California, U.S.A., in Los Angeles co. Situated 34 m. by rly. E. of Los Angeles,

and served by the S. Pacific Rly., it lies in an important fruit and vegetable district, and carries on a large trade in oranges. Pomona was settled in 1875 and incorporated 1887. Pop. 13,500.

Pompadour, JEANNE ANTOINETTE POISSON, MARQUISE DE (1721-64). Mistress of Louis XV. Born in Paris, Dec. 29, 1721, she was the illegitimate daughter, by Madeleine Poisson, of Le Normant de Tournehem, whose nephew, Le Normant d'Étioles, she married in 1741. She became mistress of Louis XV in 1745, and thenceforth, a woman of high talents and with great ambition, exercised much political influence. She accumulated a large fortune for herself and her relatives, became a duchess,



Marquise de Pompadour, Lady
of the Court of Louis XV

From the portrait by Boucher in the Wallace
Collection, London.

1752, and lady-in-waiting to the queen, 1756. She personally carried out many of the king's state duties, and her patronage of writers and artists such as Voltaire, Crébillon, Quesnay, Helvétius, Van Loo, and Boucher enhanced her influence. The French alliance with Austria, 1756, was due to her personal spite against Frederick II. She died at Versailles, April 15, 1764. See Mme. de Pompadour, E. and J. de Goncourt, new ed. 1896; Mme. de Pompadour, H. N. Williams, 1902.

Pompeia. Name of a Roman plebeian gens, or clan, the most important member of which was:

GAEUS POMPEIUS (106-48 B.C.). Roman general and triumvir. Commonly known as Pompey the Great, he received from Sulla, as the reward of his military achievements, the surname of Magnus, a



Pompey the Great,
Roman general

From a bust

title which descended to his sons. He was born Sept. 30, 106 B.C., of a family which in the great strife between the democratic and the aristocratic parties in Rome, took the senatorial side. In 89 young Pompey was already serving with the army under the command of his father. He became so popular with the soldiers that, when Sulla landed in Italy in 84, determined to overthrow the dominant democratic faction, Pompey was able to lead a considerable force to support him. Sulla gave him responsible employment, and during the next three years he rendered brilliant services, especially in the overthrow of the Marian, or democratic, party in Africa. These were the triumphs which caused Sulla to hail him as Magnus, the Great. After Sulla's death in 78, Pompey remained for a time one of the recognized leaders of the senatorial party, whose armies he commanded in Spain, 76-71.

Returning to Rome, he broke with his former allies, and in 67 was appointed with extraordinary powers for the suppression of the pirates in the Mediterranean. In this task he was completely successful, and in 66 he was sent to the E., again with extraordinary powers, primarily for the purpose of overthrowing Mithradates (q.v.). Again he was successful, and brought the entire east under the Roman sway.

After the year 62 his hitherto brilliant record became one of failure. Since now he would neither give way to the senate nor seize absolute power, he formed an alliance, known as the first triumvirate, with Crassus and Julius Caesar. In 58 Caesar took up the proconsulship or governorship of Gaul, an office which, by means of the armies at his disposal, he was able to use as a step towards making an ultimate bid for supreme power. Pompey, remaining in Rome, rapidly lost influence. In 52 the government broke down altogether, and again Pompey had his chance. He again hesitated, lost his opportunity, and threw himself upon the support of the senatorial faction. The result was the invasion of Italy by Caesar at the head of his proconsular army in 49, the decisive defeat of Pompey at Pharsalus, Aug. 9, 48, and his flight to Egypt, where he was assassinated, Sept. 29. See Life of Pompey, Plutarch; Seven Roman Statesmen, C. W. C. Oman, 1902.



1. Sepulchres in the Street of Tombs. 2. The Street of Abundance, so called as the centre of the jewellers. Note the stepping stones across the roadway, and the square public fountain beyond. 3. An oil merchant's shop,

with earthenware jars for storing the oil. 4. A room in the baths, showing niches for depositing clothes. 5. Peristyle and inner court of Pompeian house. 6. Temple of Isis. 7. Inner shrine of the Temple of Venus or of Apollo

POMPEII: EXCAVATED REMAINS OF THE CITY OVERWHELMED BY VESUVIUS

Pompey's younger son, Sextus Pompeius Magnus (d. 35 B.C.), escaped from the battle of Munda



Sextus Pompeius

From a statue in the Louvre, Paris

(45 B.C.), and for some time lived in retirement in Spain. In the second civil war he emerged from retirement and, collecting a powerful fleet, seized Sicily and seriously inter-

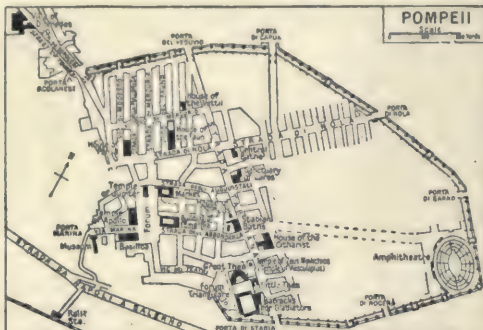
fered with the supply of grain to Rome. In 36 the fleet of Pompeius fled, but eventually was captured in Asia and put to death.

Pompeia. Wife of Julius Caesar, by whom she was divorced in 61 B.C. While the mysteries of the Bona Dea were being celebrated in her house, the profligate Clodius succeeded in gaining entrance disguised in woman's clothes. There was no real evidence of any intrigue between Pompeia and Clodius, but Caesar divorced Pompeia on the grounds that "Caesar's wife must be above suspicion."

Pompeii. Ancient city of Campania, Italy. Its ruins lie $1\frac{1}{2}$ m. from the sea, at the S.E. foot of Mt. Vesuvius, 15 m. by rail S.E. of Naples. Founded by the Oscans, it was partially Hellenised, conquered by the Samnites, and taken from them by the Romans in 290 B.C. Having joined the Italian revolt in 90, it was made a Roman colony in 80 B.C. A small but flourishing town and seaport, it became a pleasure resort of wealthy Romans, though never a place of great importance. Wrecked by an earthquake, A.D. 63, it was hastily rebuilt, though many of its buildings were still ruinous when it was overwhelmed by the great eruption of Vesuvius, Aug. 24, 79. A torrent of mud was followed by showers of ashes and glowing cinders, which burnt the upper parts of the buildings, the city being buried at an average depth of 20 ft. Of about 20,000 inhabitants, perhaps 2,000 perished.

In 1748 the discovery of some statues led to the exploration of the site. Desultory search gave place to systematic excavation on the French occupation in 1806, but it is only since the Italian government took up the work in 1861 that it has been scientifically prosecuted.

The city, built on a low hill of lava, stood at the mouth of the river Sarnus. The walls, with towers and eight gates, enclosing an irregular oval, are nearly two miles long, but had been pulled

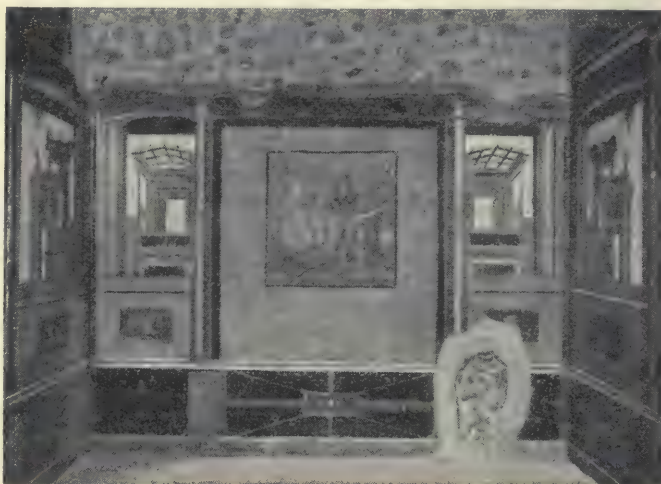


Pompeii. Plan of the ruins of the ancient Roman city

down on the sea side. The streets are narrow and generally straight, and are paved with lava. Of the two *fora* or market-places, the larger is surrounded on three sides by a colonnade, and facing it are the principal temples, the municipal buildings, the *macellum* or provision market, and other public edifices. The smaller, or triangular forum, partly sur-

reds, blues, and yellows predominated. The paintings were on stuccoed walls, and represented mythological beings, landscapes, and studies from bird or plant life. Fantastical architectural motives were often woven into the design. See Io; Iphigenia; Issus; Lytton, Edward Bulwer, 1st Baron.

Bibliography. Pompeii, T. H. Dyer, 1867; Buried Cities of



Pompeian Decoration. Room of house at Pompeii, showing mural painting suggesting open windows and raised columns, a style still popular in Italy

rounded with a portico, contains scanty remains of a Greek temple. Near it are two theatres and the gladiators' barracks. At the E. end of the city is an amphitheatre.

There are three *thermae*, or public baths, one of which was in course of construction when the catastrophe occurred, and without the walls are two streets of tombs. The most interesting remains are the private houses, which illustrate with extraordinary vividness the life of all classes. Their outer walls are generally blank or faced by shops, but within the larger houses are courts and gardens, and lavishly decorated rooms.

Pompeian Decoration is a term

Vesuvius: *Herculaneum and Pompeii*, J. F. Horne, 1895; *Pompeii, Its Life and Art*, A. Mau, Eng. trans. F. W. Kelsey, 2nd ed. 1902; *Greek and Roman Methods of Painting*, A. P. Laurie, 1910.

Pompey. English form of the Latin name Pompeius, specially applied to Gnaeus Pompeius, called Pompey the Great. See Pompeia.

Pompey's Pillar. Monument at Alexandria, Egypt. It was set up in 302 in honour of the emperor Diocletian. A red granite column with a Corinthian capital, it is 99 ft. in height. The name is due to a mistaken idea that it marked the site of Pompey's tomb. See Alexandria; Pillar.



Pom-pom. Maxim 37-mm. automatic machine gun on cone mounting, fed by belts of 25 rounds

Pom-pom. Small calibre cannon in which the shells are loaded and fired, and the empty cases ejected by automatically operated mechanism. These guns were used largely by the Boers in the South African War, and in the later stages by the British troops. The shells weigh about 1½ lb., the smallest explosive projectile permitted under the Geneva Convention. Usually the shells are fed in belts of 25 for the Maxim and clips of 8 for the Hotchkiss. The name is derived from the noise caused by the projectiles bursting in rapid succession. *See* Gun; Hotchkiss Gun; Machine Gun; Maxim Gun; Ordnance.

Ponapé. Chief of the Caroline Islands, Pacific Ocean, under the mandate of Japan. Off the shore, beyond an islet-dotted lagoon about 1½ m. across, is a barrier reef. The soil is very fertile. Its area is 340 sq. m. Pop. 3,000. *See* Caroline Islands.

Ponce. Town of Porto Rico. The second largest town of the island, it lies 3 m. from its harbour, Playa de Ponce, on the S. coast. It manufactures lace, cigars, and hats, and exports coffee, sugar, tobacco, and fruits. Pop. 63,500.

Ponce de Leon, JUAN (c. 1460-1521). Spanish explorer. Born at San Servas, Leon, he accompanied

colony there in 1521.

Ponce de Leon, LUIS (1527-91). Spanish poet. After studying at Salamanca he became professor of theology in the university, 1561. Charged with heresy by the Inquisition in 1572, he was imprisoned for four years, being then reinstated as a professor. He died Aug. 23, 1591, within a few days of becoming vicar-general of his Order. His most famous work was the mystical *Of the Names of Christ*, published 1583-85. His poems were issued by Quevedo in 1631.



Poncho, as worn in the Argentine

Pond, JAMES BURTON (1838-1903). American lecture manager. Born at Cuba, Allegheny co., New York, he started life as a compositor and printer. In 1861 he joined the 3rd Wisconsin cavalry, and in 1863 was one of the survivors of the treacherous attack at Baxter Springs. In 1873 he bought a lecture agency at Boston, and in 1879 established the American Lecture Bureau in New York. He died June 21, 1903.

Columbus to America, 1493, in 1510 was appointed governor of Porto Rico, and in 1513, voyaging N., discovered Florida. After cruising along the coast he visited the Bahamas and then made his way to Spain, where he procured a grant for the colonisation of Florida. He was killed whilst attempting to establish his

colony there in 1521.



Juan Ponce de Leon, Spanish explorer

by a Frenchman about 1675, and was made a fortified post. The buildings include government house, the hôtel de ville, and the cathedral. Taken by the Dutch, it was restored in 1697. The British captured it in 1761, 1778, 1793, and 1803, but each time it was restored when peace came. Pop. 27,500.

Pondoland. Country forming one of the Transkeian Territories of the Cape Province, British S. Africa. It stretches along the coast, S.W. of Natal. British sovereignty was proclaimed in 1878 over the tidal estuary of the St. John's river and the country was annexed to Cape Colony in 1894. The inhabitants, the Pondos, number 234,000. The area is 3,906 sq. m.

Pondweed (*Potamogeton*). Genus of aquatic herbs of the natural order Naiadaceae. They are na-



Pondweed. Frond of curled variety, *Potamogeton crispus*

tives chiefly of temperate regions. They have submerged, translucent or floating, opaque leaves, and simple flowers in spikes.

Poniard (Lat. *pugnus*, fist). Term used for a small dagger.



J. B. Pond, Lecture manager

Pondicherri. Seaport and town of India, belonging to France. It stands on the E. coast, 85 m. from Madras, and is di-



Pondicherri, India. Government House in the chief of the French settlements in India

It usually refers to a slender weapon of this kind, introduced from France, having a triangular or square blade, and used for stabbing at close quarters. *See* Dagger.

Poniatowski. Name of a famous Polish family. Stanislas Poniatowski (1677-1762) was in the service of Charles XII of Sweden, and afterwards held high positions in Lithuania and Poland. One of his sons, Stanislas, became king of Poland; another, Michael, became archbishop of Gnesen. The family became extinct when Stanislas, a grandson of the earlier Stanislas, died in 1833, but a natural son, Joseph (1816-73), carried on the name. He became a prince in Tuscany and in Austria, and was for many years the envoy of the former country in Paris. His last years were passed in England, where he shared the exile of his friend, Napoleon III.



Count Stanislas Poniatowski

Poniatowski, JOSEPH ANTON, PRINCE (1762-1813). Polish soldier. Born May 7, 1762, he entered the



Prince Poniatowski, Polish soldier

Austrian army. In 1789 he became a general in the Polish army, and in 1791 was commander-in-chief of the operations against Russia. Disgusted at the terms of the treaty which concluded the war, he went into retirement. War minister of the duchy of Warsaw, he resisted the Austrian invasion of 1809, in 1812 commanded a corps in Napoleon's Russian campaign, and remained in the emperor's service until his death after the battle of Leipzig, Oct. 16-19, 1813. He had just been made a marshal.

Ponnani. Harbour of Madras presidency, India, on the Malabar coast. It is situated at the mouth of the Ponnani river. A road joins it to Tirur on the rly., and continues to Mysore. Pop. 14,000.

Ponsard, FRANÇOIS (1814-67). French dramatist and academician. Born at Vienne, June 1, 1814, he abandoned law for literature, publishing a translation of Byron's *Manfred* in 1837, and specialising in the drama. Aided by the consummate acting of Mme. Rachel, his *Lucrèce*, 1843, scored an immense success, but Ponsard is now remembered chiefly for his admirable comedy of manners, *L'Honneur et l'Argent*. He died in Paris, July 7, 1867.

Pons Asinorum (Lat., asses' bridge). In geometry, name popularly given to the fifth proposition

of the first book of Euclid, from the supposed difficulty of beginners in understanding it. The proposition states that the angles at the base of an isosceles triangle are equal to one another. See *Geometry*.

Pons Varolii. Band of nerve fibres on the under surface of the brain which connects various parts of the brain together. See *Brain*.

Pons Winnecke. Name of a periodical comet. First discovered by J. L. Pons in 1819, and rediscovered by Winnecke in 1858, it has been seen at approximately six year intervals since. One of the lesser sized comets, it belongs to the Jupiter family of comets, and its irregular appearances and change of orbit have been due to the gravitational pull of the planet. Its last appearance was in 1921, when it passed close to the earth. See *Comet*.

Ponta Delgada. Capital of St. Michael's, Azores Islands. It is a winter resort, and its harbour is protected by a breakwater nearly 3,000 ft. long. The commercial centre of the Azores, it manufactures cotton fabrics, pottery, straw hats, and spirits. Pop. 16,200.

Pont-à-Mousson. Town of France. In the dept. of Meurthe-et-Moselle, it stands on the Moselle at the foot of the Mousson Mt., 18 m. N.W. of Nancy. On a height to the E. are the ruins of the



Pont-à-Mousson, France. Building known as House of the Seven Deadly Sins

château. The Late Gothic church has interesting vaulting and a 16th century altar-piece. Needles, matches, plush, and velvets are made. The town, which once belonged to the counts of Bar, became a municipality in 1444 and the seat of a university in 1571. In the Franco-Prussian War it was

important, as guarding a passage over the Moselle. It was in French occupation throughout most of the Great War, though shelled by the Germans intermittently. In 1918 American troops occupied the sector to the north of it just before their attack on the St. Mihiel (q.v.) salient. See *Nancy*, *Battle of*.

Pontardulais. Village of Glamorganshire, Wales. It stands at the junction of the rivers Dulais and Loughor, 8 m. from Swansea, and is served by the G.W. and L. & N.W. Rlys. Coal is mined.

Pontarlier. Town of France. In the dept. of Doubs, it stands on the Doubs, in the midst of the Jura Mts., and on the Dijon-Neuchâtel-Lausanne Rly., 26 m. S.E. of Besançon. It manufactures paper and clocks, and trades in cattle, cheese, and agricultural produce. In the fort de Joux, near the town, Mirabeau was imprisoned, 1775, and Toussaint l'Ouverture died a prisoner in 1803. Pontarlier was burned by the Swedes in 1639. Pop. 8,800.

Pontchartrain. Salt-water lake in Louisiana, U.S.A. It is situated in the S.E. part of the state, about 6 m. N. of New Orleans, and measures about 37 m. by 23 m.

Pont du Gard. Aqueduct of France. Spanning the Gard above Remoulins, it is one of the finest Roman structures in existence. It was built over the valley to conduct the waters of the Eure and Airon to Nîmes. The bridge is 880 ft. long and 160 ft. high, and consists of three tiers of arches composed of massive stones without cement. Damaged in the 5th century, it was restored 1855-58. See *Aqueduct*; *Nîmes*.

Pontecorvo. City of Italy, in the prov. of Caserta. It stands on the left bank of the Garigliano, 39 m. N.W. of Capua and 5 m. from Aquino station. It has a cathedral, several churches and convents, a castle, and a triumphal arch with a statue of Pope Pius IX. The city was included in the Papal States down to 1860. Napoleon gave the tiny principality (scarcely 40 sq. m. in area) of Pontecorvo to Bernadotte in 1806. Pop. (commune) 11,400.

Pontefract OR **POMFRET.** Mun. borough and market town of Yorkshire (W.R.), England. It is 21 m. from York and 14 from Leeds, near the junction of the Aire and the Calder, and is served by the Mid., N.E., & L. & Y. Rlys. The ruins of the Norman castle show



Pontefract arms



it to have been one of unusual strength and size. Part of it is now used as a museum, and the adjoining grounds have been made into a public recreation ground. Of the churches the chief are S. Giles and All Saints. Two old foundations are Trinity Hospital and S. Nicholas almshouses. The grammar school is a modern building, but the school itself is old. There is a town hall, court house, market hall, and assembly rooms. Features of the town are an old hermitage cut out of the rock, and the windmill on S. Thomas's Hill, the eminence where Earl Thomas of Lancaster was executed. The chief industries are tanning, brewing, iron-founding, and corn-milling. Pomfret cakes made here are lozenges of liquorice. The borough includes the suburb of Tanshelf.

The original name of Pontefract was Kirkby, where a castle was built by the Normans. Soon the name was changed, and the town became important owing to its geographical position, and the fact that it was a stronghold of the dukes of Lancaster. In 1399 Richard II was murdered here. The castle was taken and retaken during the Civil War, after which it was destroyed. The borough rights began early, and soon the borough had a merchant guild, markets, and a mayor. The first charter was granted by Robert de Lacy in 1194, he being a descendant of the Lacy who received from William the Conqueror the honour of Pontefract. From 1621 to 1918 Pontefract was separately represented in Parliament, first by two and then by one member. Race meetings are held in the town park. Market day, Sat. Pop. (1921) 16,800. See Pontefract, R. Holmes, 1878.

Pontevedra. Maritime prov. of N.W. Spain, facing the Atlantic Ocean. It is bounded N. by Corunna, E. by Lugo and Orense, and S. by the Portuguese prov. of Minho. Densely populated, and largely mountainous, it yields timber and agricultural produce. The capital is Pontevedra, other

towns being Vigo and Redondela. Its area is 1,695 sq. m. Pop. 506,800.

Pontevedra. City of Spain. Capital of the



prov. of Pontevedra, it stands near the mouth of the river Lerez, in the Bay of Pontevedra, 13 m. N.N.E. of Vigo, with a station on the Santiago-Tuy Rly. The river is here spanned by a twelve-arched Roman Bridge, the Pons Vetus. Santa Maria Mayor is a Gothic edifice with a 16th century façade, while the church of San Francisco contains many beautiful tombs. To the west of the town, near to the road from Carril, are the ivy-clad ruins of the 13th century conventual church of Santo Domingo, including fine apses, beautiful arcades, and some interesting tombs. The town has a trade in agricultural produce and some small manufactures. The name is a corruption of the Latin *pons vetus*, old bridge. Pop. 24,000.

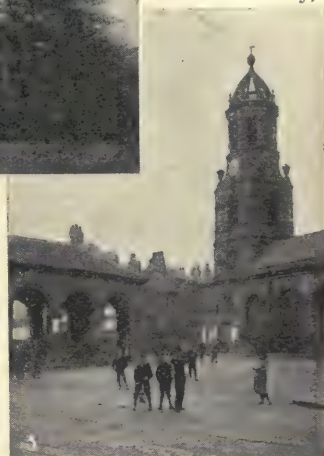


Pontevedra, Spain. Ruins of the church of the 13th century convent of S. Domingo

Ponhierville. River port on the Congo. It is 78 m. above Stanleyville (*q.v.*) by rail. S. of Ponhierville the Congo again becomes navigable as far as Kindu.

Pontiac. City of Michigan, U.S.A., the co. seat of Oakland co. It stands on Clinton river, 25 m.

N.W. of Detroit, and is served by the Grand Trunk and other rlys. Manufactures include motor vehicles, carriages, wagons, agricultural machinery,



Pontefract, Yorkshire. 1. Ruined hall of the castle. 2. Parish church of All Saints. 3. Church of S. Giles and Market Place

flour, varnish, and foundry and machine-shop products. Settled in 1818, Pontiac was incorporated in 1837 and became a city in 1861. Pop. 34,300.

Pontiac (c. 1712-69). North American Indian chief. As chief of the Ottawas he assisted the French commander, Montcalm, against the British, and took part in the annihilation of Braddock's force in 1755. In 1763 he was mainly responsible for the carrying out of a conspiracy against the British garrisons in N. America, and unsuccessfully besieged Detroit for five months. He was murdered by an Indian of the Kaskaskian tribe in 1769. His story is treated in Sir Gilbert Parker's novel, *When Valmond came to Pontiac*, 1895. See *History of the Conspiracy of Pontiac*, F. Parkman, 10th ed. 1896.

Pontifex (Lat., bridgemaker). Member of the most important college of priests in ancient Rome. The college was charged with the maintenance of the law in so far as it was bound up with religion, a special function being the supervision of the calendar. In the last period of the republic the *pontifices* were 15 in number, holding office for life; at their head was the pontifex maximus, whose office, of great dignity, was held under the empire by the emperor himself. When Christianity became the state religion the title was assumed by the popes.

Pontifical OR **ORDINARIUM**. Roman Catholic service book for the use of bishops or of priests specially empowered by bishops. Books of this kind originated in the 8th century; that in the National Library, Paris, is attributed to the 8th-10th centuries. They were compiled by bishops from old sacramentaries, etc., in the Middle Ages. The Roman pontifical was first printed in 1485; that in use was revised by order of Leo XIII. The Greek Church has its own pontifical. A bishop's vestments are called pontificals. See Hungary; consult also *Pontificale Romanum*, G. Catalani, 1738; *Bibliotheca Ritualis*, F. A. Zaccaria, 1776-81; *Monumenta Ritualia*, W. Maskell, 2nd ed. 1882.

Pontigny. Village of France. It stands on an island, formed by the Serain, in the dept. of Yonne, 11 m. N.E. of Auxerre. It is famous for its Cistercian abbey. Founded in the 12th century, by Count Thibaud of Champagne, it was a refuge for both Becket and Langton, while here S. Edmund Rich was buried. Its Gothic church has been restored as a national monument, and there are other monastic remains. Pop. 900.

Pontine Marshes. Low-lying malarious tract of W. Italy. In the prov. of Rome, it bore the name of *Pomptinae Paludes*. It extends along the Mediterranean coast between Cisterna on the N. and

Terracina on the S. About 25 m. in length, its breadth varies between 6 m. and 11 m. In ancient times the district was well drained, with prosperous villages and farms, and was inhabited by the Volsci. After the subjugation of that people by the Romans, the drainage works fell into disrepair and it became a



Pontoise, France. Façade and tower of the church of S. Maclou

malarious waste. Appius Claudius tried to drain it when, in 312 B.C., he drove the Appian Way through it. Various attempts have since been made to reclaim it, Pope Pius VI in the 18th century constructing huge drainage works. In 1899 a large sum of money was allotted by the Italian government for reclamation purposes.

Ponting, HERBERT GEORGE. British photographer. Son of a Southport banker, after some years of ranching in California he travelled twice round the world with his camera and took the highest award at Dresden in 1909 for his travel photographs of Asia. Joining Captain Scott's Expedition, he obtained a remarkable series of pictures of the Antarctic, which were afterwards exhibited on the screen, his cinema lecture being given over 1,000 times in London in 1914 and later.

In 1921 he published an account of his experiences under the title of *The Great White South*, with illustrations of nature life in the S. Polar regions. Thousands of his travel photographs are in use in America for educational purposes, and in England.



H. G. Ponting, British photographer

Pontivy. Town of France. In the dept. of Morbihan, Brittany, it stands on the Blavet, and the canal from Nantes to Brest, 30 m. N.N.W. of Vannes. The chief buildings are the church and the château, now a museum, and the chief industries linen and paper-making. There is a trade in agricultural produce. The newer part of the town is known as Napoléonville. It was built by Napoleon to accommodate a great number of soldiers, because he wished to make the place a military centre. Pop. 9,500.

Pont-Neuf. Oldest bridge over the Seine, Paris. Built 1568-1603, remodelled in 1843-53 and again partly restored in 1886, it is 369 yds. long and 25 yds. in width. The equestrian statue of Henry IV dates from 1818, when it replaced an earlier work of 1635, converted into cannon in 1792. The bridge was famous in the 17th and 18th centuries as a gathering place for showmen. See Paris.

Pontoise. Town of France. In the dept. of Seine-et-Oise, it stands at the junction of the Oise and the Viosne, 17 m. from Paris. The chief buildings are the churches of S. Maclou and Notre Dame. There are manufactures of chemicals, an agricultural trade, and some shipping on the Oise. Pontoise was founded by the Gauls, and was a fortified town under the kings of France. It became the capital of the Vexin, and was taken and retaken several times. Pop. 9,000.

Pontoon (Lat. *ponto*, punt, floating bridge). Flat-bottomed boat, particularly one of special design employed for military bridge-building. This type of bridge utilises the boats as piers, the superstructure forming the roadway being thrown across from boat to boat. It can be speedily erected and is particularly useful for crossing wide streams, as no foundations for the piers are required. Boat bridges have been used since the earliest times. Modern pontoons are usually made in two or three sections for convenience of transport. Boats about 21 ft. long carry a roadway ten ft. wide, the distance between boats being proportioned to the load the bridge is to carry. See Bridge.

Pontoppidan,

HENRIK (b. 1857). Danish novelist. Born at Fredericia, July 24, 1857, he made his name in 1881 with a volume of stories portraying vividly peasant life. This was fol-



H. Pontoppidan, Danish novelist



Pontoon. Stages in the construction of a pontoon bridge. 1. Making roadway across the pontoons. 2. Fixing ribbands or sides of road. 3. Swinging the pontoon bridge into position as seen in 4.

lowed by a number of novels, including *The Promised Land*, 1892, Eng. trans. 1896; *Lucky Peter*, which appeared at first in eight volumes, 1898-1904; and a drama, *Storeholt*, 1913.

Pontoppidan, MORTEN OXENBALL (b. 1851). Danish clergyman and author. Son of a Lutheran rector, and brother of Henrik Pontoppidan, he was born at Ribe, Jan. 3, 1851, and educated at Randers and Copenhagen University. Curate of S. Olaf, Elsinore,

1876-78, he held other livings, and was for a time master of a high school. At Copenhagen, in 1891, he started a popular religious magazine called *Free Testimony*. A widely read author, his most notable books include *The Garden of Paradise*, *A Danish Clergyman*, and *Never Despair*.

Pontremoli. City of Italy, in the prov. of Massa e Carrara. Situated on the river Magra, at the foot of the Apennines, it is 25 m. by rly. N.E. of Spezia. It contains a

17th century cathedral. There is trade in wine and olive oil. A republic in the 12th and 13th centuries, Pontremoli was captured by the French in 1495. Pop. 14,000.

Pontresina. Village in the Bernina Valley, Upper Engadine, Switzerland, in the canton of Grisons. Situated at an alt. of 5,915 ft., 5 m. by rly. S. of Samaden and 4 m. E. of St. Moritz, it is a favourite tourist resort in summer and in winter. The church of S. Maria has a wooden roof dating from 1497. Pop. 500.

Pontus. Ancient dist. of Asia Minor. Lying along the Black Sea, it was a monarchy about 400 B.C., and was a prosperous country, strong and independent, until its king, Mithradates the Great, was conquered by Pompey, 63 B.C. Part of it became a Roman province, and the rest survived as a state under a native ruler until A.D. 63, when this, too, was taken by Rome. Amasia was the capital, and afterwards Pharnacia.

Pontypool. Urban dist. and market town of Monmouthshire, England. It is 8 m. from Newport, with stations on the G.W. and L. & N.W. Rlys., being also served by a canal which connects it with Newport. The buildings include S. James's Church and the town hall. It stands on the border of the S. Wales coalfield, and the chief industries are coal-mining and



Pontresina, Switzerland. General view of the village, with Roseg Valley and glacier in the distance



Pontypool, Monmouthshire. Hanbury Road, showing on the right the Town Hall, built in 1850

works for making iron and tin plate. In the 17th century Thomas Allgood made japanned wares here, and sheet iron was manufactured a little later. Market day, Sat. Pop. 6,500.

Pontypridd. Market town and urban dist. of Glamorganshire, Wales. It stands at the junction of the rivers Rhondda and Taff, 12 m. from Cardiff, and is served by the G.W., Taff Vale, and Rhondda Valley Rlys. The principal buildings include S. Catherine's church, municipal buildings, town hall, and free library. In the neighbourhood



Pontypridd arms

bridge, is several miles distant. Pontypridd was only a village until the industrial developments of the 19th century. Pop. 47,000.



Pontypridd, Wales. The old bridge over the Taff, which dates from 1755

Pony (Old Fr. *poulenet*, from Lat. *pullus*, young animal). Small type of horse, ranging in height

from 14 hands to as low as eight. There is little doubt it is the oldest breed of domesticated horse. In many details the small, half-wild ponies of the Shetland Islands and Connemara show points of resemblance to Przewalsky's wild horse of Mongolia, and also with the sketches of horses found in cave dwellings.

Prehistoric remains have been found in Ireland, and it was abundant in Britain in the Bronze Age. The horses used by the ancient Britons for their war chariots appear to have been Celtic ponies. This Celtic breed is now found in its purest form in Iceland, but the ponies of the Faroë and Shetland Islands have undergone but slight modification. In their pure form these ponies lack the chestnuts on the hind limbs and the ergots on

the fetlocks. They develop a heavy rough coat, and the mane and forelock are remarkably luxuriant. Another peculiarity is that the hairs at the base of the tail are very stiff and stand out protectively on either side.

The ponies of the Devonshire

moors and the New Forest have undergone considerable modification, and this applies also to the



Pony. Some varieties of the breed. 1. New Forest pony, domesticated. 2. Mongolian, or Przewalsky's horse. 3. Welsh mountain pony. 4. Shetland stallion

ponies of the Welsh hills. The various native strains have been greatly improved by the introduction of thoroughbred blood and by selection in breeding. The great aim of all breeders is to combine smallness and compactness with general usefulness. *See* Animal Intelligence; Horse, and colour plate; Polo.

Ponza (anc. Pontiae). Chief island of a small group in the Tyrrhenian Sea, belonging to Italy. It is 70 m. W. of Naples, and has a spacious harbour. The islands were used in Roman times as a place of banishment, and are still penal settlements. Pop. 4,500.

Pood OR **PUD** (Norse, *pund*, pound). Russian measure of weight, equal to 40 Russian or 36 English pounds. About 62 poods make a ton.

Poodle. Breed of dog commonly supposed to be of French origin, but found in both Russia and Germany. In France and Russia the poodles are black, but in Germany a white breed is found.

The poodle is considered to be the most intelligent of all dogs; it learns tricks very readily. Essentially a water dog, it makes one of the best retrievers known, and in Germany and France is largely employed in the chase. In its natural state the poodle has a very long coat, which often hangs in cords and drags the ground; but the popular fashion is to clip the hinder half of the body and the legs and tail, leaving the hair in tufts. *See* Dog, colour plate.

Pool. Body of fresh water smaller than a lake (*q.v.*). The word is also used for the monetary stake contributed by the various players in card and other games, and indeed for any common fund. Such was the pool suggested in 1920-21 to assist the mining industry in Great Britain, and there have been suggestions for a pool in other industries, the idea being that to it the state, the owners, and the workers shall contribute.

Pool. Game played on a billiard table. It is played by any number of players from two to twelve, each having a different coloured ball dealt out to him by the marker, and playing in turn according to the sequence of the colours on the scoring-board. The object of the game throughout is to pocket the ball played on. The game begins by the white ball being placed upon the billiard spot, and the red ball is played by its owner, from the D,

upon the white, the yellow on red, green on yellow, and so on, by their respective owners. When a player pockets the ball which has come to him in proper rotation, he plays upon the ball nearest to the position where his own has stopped, continuing the process until he fails to score. Each person contributes an equal share to the pool, and starts with three lives, losing a life and paying forfeit each time his ball is



Poodle. Champion corded poodle; top, right, white miniature poodle

pocketed by another player. A player who loses all three lives may under certain conditions "star," i.e. purchase another life or lives according to the state of the game. The last player left in takes the pool. *See* Billiards.

Poole. Mun. borough, seaport and market town of Dorset, England. It stands on a peninsula, 5 m. from Bournemouth and 113 from London, with a station on the L. & S. W. Rly. The chief buildings are the town hall, dating from 1761, school of art, nautical school, and several churches, and the borough owns Branksome Park



Poole arms



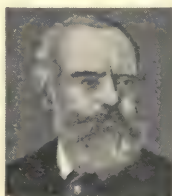
Poole, Dorsetshire. The Guildhall, built in 1761
Frith



and Poole Park. There is some shipping and a few manufactures, including pottery, rope, and agricultural implements. During the Great War shipyards were established here. The borough includes Branksome. Poole was a flourishing seaport in the Middle Ages. A borough in the 13th century, it was made a county of itself in 1569, and was separately represented in Parliament until 1885. Poole Harbour is an inlet of the English Channel, about 7 m. long and $4\frac{1}{2}$ m. broad. Within it is Brownsea, or Branksea Island, on which is a castle built in the 16th century. Market day, Thurs. Pop. (1921) 43,661.

Poole, SIR FREDERICK CUTHBERT (b. 1869). British soldier. Born Aug. 3, 1869, he was commissioned in the R.G.A. at the age of twenty, served in the Tirah Expedition, 1897-98; the South African War; Somaliland, 1903-4, and throughout the Great War, being in command of the North Russian Expeditionary force, 1918-19. Knighted in 1919, in 1920 he retired. *See* Archangel, Expedition of 1918.

Poole, REGINALD STUART (1832-95). British archaeologist. Born in London, Feb. 27, 1832, he resided in Cairo, 1842-49. He published a chronology of ancient Egypt, 1851; entered the British Museum coins and medals department, 1852, and became keeper, 1870. He lectured at University College and the Royal Academy, London. He died in London, Feb. 8, 1895.



Reginald S. Poole, British archaeologist
Elliott & Fry



Poona, India. Top, lake and peak of Parvati, on which stands the temple, shown below

Poona. Town of Bombay, India. The capital of a district, it stands at the union of the rivers Mutha and Mula, 120 m. from Bombay, and is an important rly. and road junction. It consists of a native town and a European quarter, and is the residence of the governor of Bombay during the rainy season, and an important military station. An educational centre also, here are the Deccan and Fergusson colleges, as well as other establishments of the kind. The industries include the making of fine wares of gold, silver, brass, etc., and of cotton, paper, and flour. The buildings included temples and others erected by the Marathas, who made Poona one of the centres of their power, and more modern ones built by Europeans. The district of Poona has an area of 5,360 sq. m. Pop., dist., 1,072,000; town, 159,000.

Poon-wood (*Calophyllum inophyllum*). Tree of the natural order Guttiferae. A native of India and Malaya, it has large oblong leaves and sweet-scented flowers in loose sprays. The reddish fruit is the size of a walnut, and its

seeds yield a thick, green oil, used medicinally. Poon-wood is used for building purposes, and for making masts and spars.

Poop (Lat. *puppis*, stern of a ship). Name given to a light deck raised above the main deck of a ship. It is in the stern of the vessel, and in the old fighting ship the poop was a deck of towering proportions. A high deck above the poop in such ships was known by the name of the poop royal. See Ship.



Poop. Top, poop of modern steamship. Below, poop of Nelson's Victory

Poor Clares OR CLARISSES. Order of nuns founded in 1212 by S. Clare with the advice of S. Francis of Assisi. They formed the Second Order of Franciscans. Having received no definite rule from S. Francis during his missionary journey in the E., they were brought under the Benedictine rule, which was repeatedly modified, and no uniform system was accepted, the Urbanists following the milder rule instituted in 1264 by Pope Urban IV, and the Coletines observing the reforms made by S. Colette in 1436. The Poor Clares devote themselves to the education of poor girls. They are under the authority of the Minorites, and the Minorities in London preserves the memory of one of their former nunneries. See Clare; Francis of Assisi; consult also S. Clare and Her Order, anon., 1912.



Poor Clares. Dress of the order of nuns founded in 1212

THE POOR LAWS & THEIR WORKING

William Latey, Barrister-at-Law, of the Middle Temple

Other articles dealing with this question include *Casual Labour; Guardian; Overseer; Pauperism*. See also *Health, Ministry of; Old Age Pensions; Trade Union; Unemployment; Wages*

The title poor law comprises legislation passed for the benefit of the needy and distressed in Great Britain since the reign of Henry VIII. The statute of 1601 laid down that each parish should take care of its aged and impotent poor people, provide work for its able-bodied poor, and apprentice its pauper

children; that "overseers of the poor" should be appointed with power to levy a poor rate and build workhouses.

The first workhouse was built at Bristol in 1697. Guardians of the poor were created by Gilbert's Act (1782). A royal commission appointed in 1832 reported that "the great source of abuse was the outdoor relief afforded to the able-bodied either in kind or in money." The Poor Law Amendment Act, 1834, followed, and a poor law board was appointed. This was replaced by the poor law board in 1847, and that by the local government board in 1871. In 1919 came the ministry of health.

All persons apparently destitute who apply for admission to the workhouse must be admitted, either by a written order signed by the clerk to the guardians or by a relieving officer or overseer, or at the discretion of the master or matron of the workhouse.



Poon-wood. Flowers, leaves, and fruit

On admission inmates have to be cleansed and clothed in workhouse clothes, their own being taken away and kept for them. Any money found upon an applicant may be used by the guardians for his immediate maintenance.

Workhouse Classification

On admission there is a medical examination of the applicant, who, if not sent to the sick ward, is placed in one or other of the following classes: (1) Infirm men; (2) able-bodied men and youths over 15; (3) boys between 7 and 15; (4) infirm women; (5) women and girls over 15; (6) girls between 7 and 15; (7) children under 7. No communication is allowed between these classes except by special permission. Married couples are separated owing to lack of accommodation, except that infirm or aged couples may be together in a separate sleeping department. To each class certain duties or tasks are assigned, such as shifting goods, digging, scrubbing, washing, ironing, wood-chopping, hoeing, needlework; children come under the Education Acts. When a workhouse is full a labour test has to be passed before outdoor relief is given.

If an inmate is found to have outside resources sufficient for his maintenance, the guardians may withhold relief, or if they give it, proceed against him before the justices for the cost of maintenance. The guardians may forcibly eject in these circumstances an inmate who refuses to go. Any inmate may quit the workhouse on giving reasonable notice.

"Casual paupers" comprise any destitute wayfarer or wanderer applying for relief. There are special wards for these, and those admitted are called upon to do certain tasks in return for a night's board and lodging. Conditions are much the same as in the other wards.

OUTDOOR RELIEF. Outdoor relief may be given by the guardians in cases of (1) sudden and urgent necessity; (2) accident or infirmity; (3) funeral expenses; (4) widows in first six months of widowhood or if they have children; (5) families of people abroad, in gaol, or in asylums, of service men, and of non-parishioners. It should not in general be given to able-bodied men; it should be granted for a fixed period only, not exceeding three months; one-half of the relief should be in kind, not cash; nor may the guardians establish any applicant in trade or business, or buy for him tools or implements.

The principle upon which outdoor relief should be given was stated

in a circular issued by the ministry of health in Sept., 1921, in connexion with the demands being made by able-bodied unemployed men in certain London boroughs for provision for themselves and their families. The relief given must be on a lower scale than the earnings of a man at work; it must be given on loan where practicable, and the applicant must give a signed statement of the income of his household from all sources; in each case, then, there must be a careful investigation by the relieving officer; the bulk of the relief in each case should be in kind.

VAGRANCY LAWS. The law confers upon the authorities certain powers for punishing the incurably idle and impostors who seek to take advantage of the poor law relief. "Idle and disorderly persons" are liable to a month's hard labour. An appeal lies to quarter sessions. They include able-bodied people who become chargeable to the rates through refusing to work, paupers becoming chargeable to parishes from which they have been removed under the old law of settlement of paupers, those who leave workhouses or casual wards without leave or remain on after their time is up, those who break the workhouse rules, etc.

Meaning of "Incorrigible Rogues"

"Rogues and vagabonds" are liable to three months' hard labour. They include men who abandon their wives and children, thereby making them chargeable to the parish, workhouse inmates who wilfully damage their clothes or the guardians' property, and those found wandering about in suspicious circumstances without visible means of subsistence. "Incorrigible rogues" include the foregoing on second or subsequent conviction. Quarter sessions may inflict a year's imprisonment and order whipping for men.

FOREIGN POOR LAW SYSTEMS. In Germany the poor law obliges local relief authorities to "relieve every poor person conformably to his need." There is no central control and no government inspectors. There are poorhouses, but outdoor relief is prevalent, though there is no legal claim to it as in England. The Elberfeld System (*g.v.*), which is almost universal, proceeds by means of voluntary officials in every district, strongly centralized in many respects.

In Holland the principle of relief is private charity with public administration intervening only in the last resort, but the tendency is more towards public assistance by means of the Elberfeld System.

In the United States the system is very like the English, except that the charitable institutions take an active part in cooperating with the poor law authorities in the prevention and removal of distress. American charities are registered. In a normal year (1910) there were 84,000 almshouse inmates.

In France there are communal institutions, the *hôpital* for curable illness, *hospice* for aged poor, incurables, foundlings, and waifs; *bureau de bienfaisance* for out-relief to the aged or needy; and *bureau d'assistance* for free medical treatment. A branch of the ministry of the interior is the controlling authority. No poor rate is levied. The funds spent come from the amusement tax, the profits on the state pawnshops, and other sources. There is a decentralized method of relief in the *arrondissement* divisions exercised by unpaid *administrateurs*. In 1905 a law was passed providing for an allowance of from 5 to 20 francs per month for every French person without resources, and either over 70 or incurably infirm. In 1909, 495,000 people were so assisted. The system is non-contributory as in the case of English old age pensions, and takes into account any resources that the recipient may have.

In Denmark there is a statutory old age allowance beginning at the age of sixty, the ordinary poor relief authorities deciding who are suitable recipients. But in Belgium, where friendly societies were debarred by law from providing life annuities for their members, the ordinary poor law arrangements have been supplemented by a contributory system of state pensions, and in addition a pension of 65 francs for every indigent worker over 65.

Bibliography. Histories of the Scotch and Irish Poor Laws, G. Nicholls, 1856; History of Vagrants and Vagrancy, C. J. Ribton-Turner, 1887; Life and Labour of the People in London, 9 vols., C. Booth, 1889-97; History of the English Poor Laws, vols. I, II, G. Nicholls, new ed. 1898, vol. III, T. Mackay, 1899; Our Treatment of the Poor, Sir W. Chance, 1899; The Vagrancy Problem, W. H. Dawson, 1910; The Prevention of Destitution, S. and B. Webb, 1911.

Poor's Roll. In Scots law, a register of persons who, on the ground of poverty, have obtained leave of the court to bring or defend actions *in formâ pauperis*. They are exempt from payment of court fees, and if the court is satisfied that they have reasonable ground of action, it appoints agents and counsel who represent them

gratuitously. The term is also applied to a register of persons entitled to or in receipt of parish relief.

P.O.P. (PRINT-OUT PAPER). Paper used for the production of photographs. It is coated with an emulsion of silver chloride and silver citrate. On exposure to daylight under a negative, it darkens to a reddish colour (i.e. prints out), producing a positive print. It is toned in a solution of a gold or platinum salt, and fixed in a bath of sodium thiosulphate (hypo), which dissolves out the unaffected silver compounds and so renders the print immune from further change in the light. After this fixing process the hypo is removed by long washing in water. See Photography: Self-toning Paper.

Popayán. City of Colombia, capital of the dept. of Cauca. It stands near the river Cauca, at the foot of the Purace volcano, 5,800 ft. alt. It has a cathedral, bishop's palace, buildings erected for government purposes, a university, and other educational establishments. A commercial highway runs S. from the city by Quito to Trujillo in Peru. The manufacture of blankets is the chief industry. Founded in 1537, it was important as a gold-mining centre in the 18th century, was nearly wrecked by an earthquake in 1834, and suffered severely in the civil wars. Pop. 18,700.

Pope, THE (Gr. *pappas* or *papas*, Lat. *papa*, father). Name specifically applied to the bishop of Rome since 1073. The full title of the pope is Bishop of Rome and Vicar of Jesus Christ, Successor of S. Peter, Prince of the Apostles, Supreme Pontiff of the Universal Church, Patriarch of the West, Primate of Italy, Archbishop and Metropolitan of the Roman Province, and Sovereign of the Temporal Dominions of the Holy Roman Church.

Known also as Pontifex Maximus, he claims supreme authority in all matters of faith. Since the unification of Italy, his territory has been confined to the palaces of the Vatican and the Lateran and the villa of Castel Gandolfo, Rome. Elected by the College of Cardinals, his coronation in S. Peter's includes the laying-on of hands by other bishops according to a rite dating from the early part of the 14th century. His ordinary dress includes a white silk cassock and rochet and a scarlet mantle; his insignia, the straight crosier, or *pedum rectum*, pall or *pallium*, and tiara or triple crown. He is addressed as Your Holiness, *Beatissime Pater*, etc., and refers to himself as *Servus Servorum Dei*, servant of the servants of God.

Including S. Peter, and the seven occupants of the Holy Catholic See (Clement V, John XXII, Benedict XII, Clement VI, Innocent VI, Urban V, and Gregory XI) who, before the Great Schism, were at Avignon, 1309-77, but excluding the 10 Anti-Popes, and the 4 Popes (Clement VII, Benedict XIII, Clement VIII, and Felix V) whose seat was at Avignon, 1378-1449, there have been 259 Roman Pontiffs, the names of those since the Great Schism being as follows:

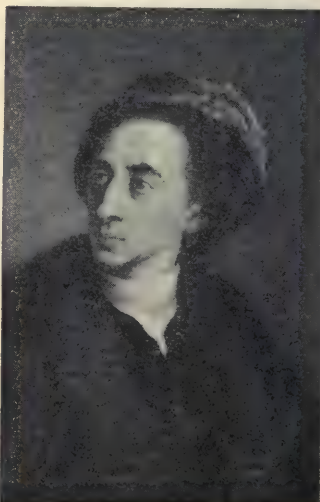
POPE OF ROME SINCE 1378.

Urban VI, April, 1378-Oct., 1389
Boniface IX, Nov., 1389-Oct., 1404
Innocent VII, Oct., 1404-Nov., 1405
Gregory XII, Nov., 1405-July, 1415
Alexander V, June, 1409-May, 1410
John XXIII, May, 1410-May, 1415
Martin V, Nov., 1417-Feb., 1431
Eugenius IV, March, 1431-Feb., 1447
Nicholas V, March, 1447-March, 1455
Calixtus III, April, 1455-Aug., 1458
Pius II, Aug., 1458-Aug., 1464
Paul II, Aug., 1464-July, 1471
Sixtus IV, Aug., 1471-Aug., 1484
Innocent VIII, Aug., 1484-July, 1492
Alexander VI, Aug., 1492-Aug., 1503
Pius III, Sept.-Oct., 1503
Julius II, Nov., 1503-Feb., 1513
Leo X, March, 1513-Dec., 1521
Adrian VI, Jan., 1522-Sept., 1523
Clement VII, Nov., 1523-Sept., 1534
Paul III, Oct., 1534-Nov., 1549
Julius III, Feb., 1550-March, 1555
Marcellus II, April, 1555
Paul IV, May, 1555-April, 1559
Pius IV, Dec., 1559-Dec., 1565
Pius V, Jan., 1566-May, 1572
Gregory XIII, May, 1572-April, 1585
Sixtus V, April, 1585-Aug., 1590
Urban VII, Sept., 1590
Gregory XIV, Dec., 1590-Oct., 1591
Innocent IX, Oct.-Dec., 1591
Clement VIII, Jan., 1592-March, 1605
Leo XI, April, 1605
Paul V, May, 1605-Jan., 1621
Gregory XV, Feb., 1621-July, 1623
Urban VIII, Aug., 1623-July, 1644
Innocent X, Sept., 1644-Jan., 1655
Alexander VII, April, 1655-May, 1667
Clement IX, June, 1667-Dec., 1669
Clement X, April, 1670-July, 1676
Innocent XI, Sept., 1676-Aug., 1689
Alexander VIII, Oct., 1689-Feb., 1691
Innocent XII, July, 1691-Sept., 1700
Clement XI, Nov., 1700-March, 1721
Innocent XIII, May, 1721-March, 1724
Benedict XIII, May, 1724-Feb., 1730
Clement XII, July, 1730-Feb., 1740
Benedict XIV, Aug., 1740-May, 1758
Clement XIII, July, 1758-Feb., 1769
Clement XIV, May, 1769-Sept., 1774
Pius VI, Feb., 1775-Aug., 1799
Pius VII, March, 1800-Aug., 1823
Leo XII, Sept., 1823-Feb., 1829
Pius VIII, March, 1829-Nov., 1830
Gregory XVI, Feb., 1831-June, 1846
Pius IX, June, 1846-Feb., 1878
Leo XIII, Feb., 1878-July, 1903
Pius X, Aug., 1903-Aug., 1914
Benedict XV, Sept., 1914-Jan., 1922
Pius XI, elected Feb. 6, 1922

The more important popes are referred to separately under their respective official names. The term Black Pope, applied to the general of the Society of Jesus, is derived from his black dress. See Anti-Pope; History; Infallibility; Papa; Papacy; Rome.

Pope, ALEXANDER (1688-1744). English poet and satirist. He was born May 21, 1688, in Lombard Street, London, where his father was a prosperous linen draper. Bred in the Roman Catholic faith, Pope was denied the privileges of education at a first-class school, but his bent was studious, and he more than made up for imperfect schooling by his reading at home. Pope's religion also made it impossible for him to enter any of the professions, while a business

life was out of the question for one who was not only weak in health, but actually deformed. His own predilection was for literature, and the fact that his father was financially independent, having retired to a small estate on the borders of Windsor Forest, made it possible for the lad to follow his own inclinations. It is said that a brief interview with Dryden at the age of twelve determined his career. He displayed remarkable precocity in verse writing, many thousands of lines having been written before he was sixteen. All these he destroyed with the exception of a



After H. Hudson

A. Pope

translation of The Thebaid of Statius and the Pastorals.

By the time he was twenty-four he had come to be regarded as the leading poet of his time. His reputation was made first by his Essay on Criticism, 1711, a didactic poem on the canons of literary taste and style, and secondly by The Rape of the Lock (q.v.), 1712, a brilliant satire on the fashionable life of his time. The poem brought him great fame, with an interesting circle of literary friends, including Gay, Addison, and Swift. Pope became a member of the Scriblerus literary club, formed under the presidency of Swift.

The task of translating Homer into rhyming pentameters now became the main occupation of Pope's life, the first part of the Iliad appearing in 1715, the last part of the Odyssey in 1725. The translations were most favourably received, but the real spirit of Homer is lacking. Pope received some £10,000 for the work, and the money

thus earned enabled him in 1718 to establish himself comfortably with his mother in a villa on the banks of the Thames at Twickenham, where he lived for the last 26 years of his life, which came to an end, May 30, 1744.

At the Twickenham villa Pope's chief diversion was landscape gardening, while the visits of his friends gave him great pleasure. During the period in which he was occupied with Homer he published two powerful poems, the *Elegy to the Memory of an Unfortunate Lady*, and the *Epistle of Eloisa to Abelard*; he was also engaged on an edition of Shakespeare. This last work came in for unfavourable criticism from a certain Lewis Theobald, an indifferent man of letters, but possessed of a sounder knowledge of Shakespeare than Pope. This so annoyed Pope that he made Theobald the hero of his great satirical poem, *The Dunciad*, 1728. The scheme of *The Dunciad*, namely the castigation of all the literary pretenders of the day, had long been in Pope's mind, the idea having been originally suggested by Swift. A fourth book was added to the original three 14 years later, Colley Cibber being substituted for Theobald as the hero. About 100 contemporary writers are impaled in *The Dunciad*, but unfortunately some of them, like the scholar Bentley, were men of real eminence.

The concluding period of Pope's life was occupied with the writing of philosophical and critical poems, of which the most notable is his *Essay on Man*, 1733, which is an exposition of the philosophy of Bolingbroke and contains passages of great eloquence. The influence of Bolingbroke, with whom he had become friendly, is also to be traced in his *Imitations of Horace* and his *Moral Essays*.

It cannot be gainsaid that Pope was of a quarrelsome disposition.

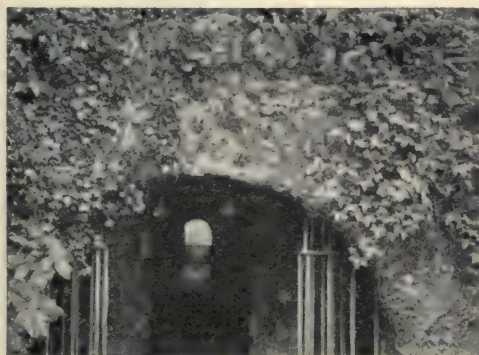
He quarrelled with Addison when the latter pronounced Tickell the best translator of Homer; he quarrelled also with Lady Mary Wortley Montagu, who called him "the wicked wasp of Twickenham," and with many others of lesser note. Much may be forgiven him, however, on account of his health, and to the credit side must be placed his uninterrupted friendship with Swift and others. His position as a poet has been the subject of much controversy. His technique is beyond praise; he handled the heroic couplet inherited from Dryden as no other poet has done; but he lacks warmth of emotion, shows no real feeling for nature, and even his finest passages are rhetoric rather than true poetry. See *English Literature*.

John McBain
Bibliography. Works, including *Life* by W. J. Courthope, 10 vols., ed. J. W. Croker and W. Elwin, 1871-89; *Lives*, O. Ruffhead, 1769; L. Stephen, new ed. 1888; *The Age of Pope*, 1700-44, J. Dennis, repr. 1908; Mr. Pope, his life and times, 2 vols., G. Paston, 1909.

Pope, JOHN (1822-92). American soldier. Born at Louisville, Kentucky, March 16, 1822, he was educated at the military academy at West Point. He served with distinction in the Mexican War, and was also engaged at different times on surveying and engineering work. Shortly after the outbreak of the Civil War he was appointed brigadier-general in 1861, and was generally successful, until defeated by Lee and Jackson at the second battle of Bull Run, 1862. Pope blamed McClellan and Fitz-John Porter for his defeat, and the latter was dismissed from the army. At his own request, however, Pope was relieved of his command, and was transferred to the North-West Department to keep the Indians in subjection. He retired in 1886 and died Sept. 23, 1892.



John Pope,
American soldier



Alexander Pope. Entrance to the groto in the poet's villa at Twickenham

ments, specially made for the purpose, is also required. The eight of diamonds is first removed from the pack. The dealer having been determined, he dresses the board (providing the stakes himself or each player contributing a share) by placing counters upon the different divisions—one each to ace, king, queen, knave, and game; two to Matrimony, two to Intrigue, and six to the nine of diamonds, known as Pope.

The cards are then dealt round, with an extra hand left in the middle of the table which forms stops; the last card being turned for trumps. Also, the four kings and the seven of diamonds are always stops. If either ace, king, queen, or knave is turned up for trumps, the dealer is entitled to whatever stake is contained in either of those compartments upon the board; if Pope is the card turned, the dealer appropriates all these and game, including a stake from each player for every card he has had dealt him.

Otherwise, the game begins by the player on the left of the dealer leading any card he chooses, generally his lowest card of any suit, at the same time naming it, and playing out a sequence, each player following on until a stop occurs, the player of the card forming the stop having the next lead. This continues until some player is out, i.e. has succeeded in getting rid of all his cards.

The first person to accomplish this is entitled to all the stakes in the compartment marked game, and also receives from the other players a counter or stake for each card left in their hands; only the holder of Pope, if this card has not been previously played, being exempt from payment. Whenever the ace, king, queen, or knave of the trump suit is played during a hand, the holder appropriates the counters contained in the corresponding compartments on the board. Knave and queen of trumps in one hand gives the player of these cards a right to all counters in the Intrigue division; and he who plays queen and king takes all counters in the division marked Matrimony. The player of Pope profits in a corresponding manner. See Joan; consult also Hoyle's *Games Modernised*, ed. E. Bergholt, 1909.

Poperinghe. Town of Belgium, in the prov. of W. Flanders. It stands on the Vleirbeck, a tributary of the Yser, 6 m. W. of Ypres. The town is a hop-growing centre and trades also in locally grown tobacco, brewing, tanning, pottery, and lace and woollen goods. The



Poperinghe, Belgium. The Grande Place in September, 1917, before the German bombardment

Romanesque church of S. Jean, 13th century, and the 15th century church of S. Bertin, with a conspicuous square tower surmounted by a cupola, are noteworthy.

During the Great War Poperinghe was a centre of the British forces on the Flanders front. The town and its neighbourhood contained numerous camps, supply services, casualty clearing stations, etc. Held by German troops at the beginning of the war, it was occupied by Allied forces on Oct. 15, 1914. It suffered sporadic bombardment from the spring of 1915 onwards, but did not suffer serious damage until the German advance in April, 1918, brought it under closer range. "Toc H" or Talbot House (*q.v.*), a social centre for officers and men, was established here in 1915. Pop. 11,500.

Popham, Sir HOME RIGGS (1762-1820). British sailor. Born at Tetuan, Oct. 12, 1762, the 21st child of his parents, he entered the navy in 1778, but a few years later transferred temporarily to the merchant service and did much useful hydrographic work in the



Sir Home Popham, British sailor

East Indies. He was attached for some time to the army in Flanders, returned to organize a system of sea-fencibles, or coast guard volunteers, and in 1799 went to Kronstadt to organize the convoy of Russian troops to Holland. Popham introduced a new system of signalling at sea, and his "Telegraphic Signals or Marine Vocabulary"

was used at Trafalgar. He commanded the fleet conveying the army which retook Cape Town in 1806, but was court-martialled and reprimanded for leaving that station and undertaking an expedition, which miscarried, against Brazil. He served in Danish, Dutch, and Spanish waters before being appointed, in 1817, commander-in-chief on the Jamaica station, a post which he retained until shortly before his death, Sept. 10, 1820.

Popinjay. Old English word for parrot. It is still used in heraldic language to describe a

parrot as a bearing or charge. The name was given to a dummy bird used as a target in early times.

Popish Plot, THE. Name given to an imaginary Roman Catholic conspiracy in 1678. Taking advantage of a popular feeling against the duke of York and all Roman Catholics, Titus Oates (*q.v.*) swore an information, Sept. 6, 1678, before Sir Edmund Berry Godfrey (*q.v.*) to the effect that a Popish plot was afoot to kill the king and carry out a general massacre of Protestants. Five weeks later Godfrey was found murdered, and popular panic ensued.

Oates seized the opportunity to lay further information, and for some two years earned the pension of £900 which had been granted him, by a series of astounding revelations compromising Catholics in all stations of life, many of whom were imprisoned or executed on the mere word of Oates or his accomplices. The Commons tried to exclude the duke of York from the succession, but by its very enormity the execution of Lord Strafford in 1680 induced a saner atmosphere, and on the dissolution of Parliament,



Poplar. 1 Black poplar, leaves and fruit of which are shown in 2. 3. Catkins, and 4. leaf of the white poplar illustrated in 5

1681, Charles II was able to allay the public frenzy. One of Oates's informers, College, was found guilty of perjury, and in 1685 Oates was himself convicted. See Dangerfield; Oates; Toleration.

Poplar (*Populus*). Genus of trees of the natural order Salicaceae. They are natives of Europe, Asia, and N. America. They have alternate leaves, and the small flowers (without sepals or petals) are crowded in hanging catkins, which usually appear before the leaves. The sexes are on different trees. The females are succeeded by dry fruits containing numerous seeds, each of which has a tuft of cottony hairs at its base. The trees are of rapid growth, and require much light. The timber is not valuable. Familiar examples are white poplar (*P. alba*), black poplar (*P. nigra*), Lombardy poplar (*P. italica*), and the Aspen (*P. tremula*). See Lombardy Poplar.

Poplar. Met. bor. of the co. of London. It lies N. of the Thames, opposite Greenwich, combines the



parishes of Poplar, Bow, and Bromley, and contains the East and West India docks, Millwall docks, and the Isle of Dogs. It is served by electric trams, motor-buses, and trains from Broad Street and Fenchurch Street. The church of S. Matthias, 1776, much restored, was once the chapel of the East India Co.; that of All Saints dates from 1823. Near to the Danish church is the Scandinavian Sailors' Home. There are a workhouse, public library, L.C.C. School of Engineering, 1906, town hall, 1871; and here for a time was a branch of Toynbee Hall. In Poplar Hospital, 1855, some 60,000 patients are treated annually. In addition to 72½ acres of Victoria Park, the bor. has several small open spaces, including Island Gardens, 3 acres, with a river front of 700 ft., opened in 1895 largely through the instrumentality of Will Crooks, M.P. In Island Gardens is the entrance to the footway tunnel to Greenwich, opened 1902. An institute was erected as a memorial to men who fell in the Great War.

With an area of 2,328 acres and a pop. (1921) of 163,000, the bor. is a centre of much casual labour. For refusing to levy rates to meet the precepts of the L.C.C. and M.A.B., certain members of the bor. council were imprisoned, Sept.-Oct. 12, 1921. In 1920-21 Poplar rates were 22s. 10d. in the £,

and the council's action was professedly dictated by dissatisfaction with the Government's treatment of the unemployed question and by a desire to expedite an equalisation of rates. Poplar, until 1817, was a hamlet of Stepney. Sebastian Cabot and Sir Walter Raleigh are said to have lived at



Popocatepetl. Summit of the great Mexican volcano, seen from the top of Ixtaccihuatl

Blackwall, and George Steevens, the Shakespearean commentator, was a native of the bor., which, as part of the Tower Hamlets div., sends two members to Parliament.

Poplin. Ribbed fabric woven with a silk warp and worsted weft, used for dress material and upholstery. Originally made in

France, it was introduced into England and Ireland by French Protestant refugees in the 17th century. Ireland has long been noted for its poplins. Poplins are made also in wool and in cotton.

Popocatepetl (Aztec, smoking mountain). Conical volcano of Mexico. Situated about 40 m. S.E. of Mexico city, it is an active volcano reaching 17,785 ft. alt. The last eruption was in 1802. The crater, measuring 2,700 ft. across, produces a large quantity of pure sulphur. The peak was first scaled by Diego Ordez in 1522. See Mexico.

Poppaea Sabina. Mistress and eventually the wife of the

Roman emperor Nero. She was a woman of infamous character, according to Tacitus possessing "everything save honour." Nero divorced Octavia to marry her.

Poppy (*Papaver*). Genus of about 40 erect, annual or perennial herbs, of the natural order Papaveraceae, natives of Europe,



Poppy. 1. Scarlet field poppy. 2. Variety of Oriental poppy. 3. Double ranunculus-flowered Shirley poppy. 4. Varieties of Shirley poppy

Asia, Africa, and Australia. The five British species have become partially naturalised in the U.S.A. They have erect stems with variously lobed or cut alternate leaves, and large, showy flowers on long stalks. The two concave sepals are thrown off usually by the expansion of the four petals. The stamens are very numerous, surrounding the conspicuous ovary whose four to 20 stigmas are united into a disk, which later forms a roof with eaves to the large seed-capsule. The numerous small oily seeds can escape from openings under the eaves of the ripe capsule only when the latter is jerked. The Field P. (*Papaver rhoeas*) is the well-known cornfield weed.

The larger Opium P. (*P. somniferum*) of Europe, Asia, W. Africa, with white or purple flowers, has become naturalised in parts of Kent and Surrey. This and the

Oriental P. (*P. orientale*) are frequently grown in gardens, where, however, the Shirley P. is the more general favourite. All poppies are easily grown from spring-sown seed in any garden soil, but they succeed best in sandy loam. All the species have a milky sap with narcotic properties, and the seeds under pressure yield a valuable oil which is not narcotic. On Nov. 11, 1921, the third anniversary of the signing of the armistice, over 6,000,000 artificial blooms, known as Flanders poppies, were sold in Britain for the benefit of ex-service men. See Fruit: Opium.

Poprád. Town in the Slovakia division of the Czecho-Slovak republic, formerly in the kingdom of Hungary. It is situated on the Poprád river at the E. end of the High Tatra on the great E.-W. rly. and road route through the Tatra mts. Pop. 2,300.

POPULATION AND THE CENSUS

Sir Leo Chiozza Money, Author of *Riches & Poverty*

In this article, illustrated with diagrams, the results of the censuses of 1921 are examined. See Birth-Rate; Census; Death-Rate; Infant Mortality; also Statistics

The population of the United Kingdom grew from a small to a very large number in quite recent times. From the remote prehistoric appearance of man in Europe in the Tertiary period, down to the middle of the 18th century, the people of the British Isles increased to no more than 10,500,000. Between 1750 and 1921, the 10,500,000 grew to over 47,000,000.

The rapid growth after 1750 was due to the inventions which brought coal into industrial use as fuel for power machines. The steam engine and the railway unlocked the coal mines and made use of the fuel. The new power made machines possible, and inventions quickly grew. Wealth rapidly accumulated as overseas trade won increasing supplies to supplement domestic foods and materials. The advance in the means of subsistence preserved alive children who otherwise would have perished. It was not that in the 19th century people had more children than in previous times; on the contrary, the stagnant population which marked the first half of the 18th century was despite a universal rule of very large families. Increasing wealth went hand in hand with public health measures to preserve life.

Prof. E. C. K. Gonner has made a careful examination of the population of England and Wales in the 18th century, and arrives at the following estimates: 1700: 5,800,000 (5,550,000 to 6,000,000);

1750: 6,300,000 (6,300,000 to 6,500,000); 1801: 8,900,000.

In the first 50 years of the period, the population grew by about 500,000; in the second 50 years, through the rise of that coal-based work which we call the Industrial Revolution, the addition was about 2,600,000. Thereafter, the rise in population in England and Wales, and also in Scotland, but not in Ireland, was very rapid. The numerical transition of the nation in the short period of 150 years, or say five generations (1750-1901), is shown in figures representing millions, as follows:

	1750	1801	1901
England & Wales	6.3	8.9	32.5
Scotland	1.2	1.6	4.5
Ireland	3.0	5.0	4.5
Totals ..	10.5	15.5	41.5

Ireland is seen to have lost population, even while England and Wales and Scotland made great gains. The main explanation is that Ireland, lacking coal, could not develop a coal-based population. Similarly in England, areas remained stagnant in population when removed far from the coal mines. The new populations, apart from the metropolis, arose in the English, Welsh, and Scottish coal areas, where it was most profitable to set up industrial plants. This point is of much importance in the population question. The weight and bulk of coal makes it costly to transport. Therefore, it is most

economically employed at its place of production. Hence the British coal areas and the foreign coal areas acquired big populations.

Coal-based industry modified for Britain the Malthusian doctrine of population. It was in 1798 that Malthus, in his famous essay, propounded the doctrine that population tended to increase more quickly than the means of subsistence could be multiplied. This was a profound and true conception, leading to the development of the modern theory of evolution and the origin of species. But the British Isles, for a time at least, defied the application in practice of the Malthusian doctrine. By foreign trade they won an increasing subsistence for a population grown to dimensions of which Malthus never dreamed. Malthus, in 1798, could hardly be expected to foresee that science would enable his countrymen to bring all the world's wealth to market in England. But, let it be observed, if at any time British industry failed to win the foreign supplies by which its great population lives, the doctrine of Malthus would reassert itself, and millions would be driven into emigration. The population of England can only be sustained by great imports, won by a great export trade and shipping.

No common census of the United Kingdom has yet been taken, but the separate investigations made in England and Wales, Scotland, and Ireland, give the following summary figures in millions (the 1921 Irish figures are estimated):

	1821	1851	1881	1911	1921
England	11.3	16.9	24.6	34.0	35.7
Wales	0.7	1.0	1.4	2.0	2.2
Scotland	2.1	2.9	3.7	4.8	4.9
Ireland	6.8	6.6	5.2	4.4	4.5
United Kingdom	20.9	27.4	34.9	45.2	47.3

In 1821 the English were 11,300,000 out of 20,900,000, or 54 p.c. of the people of the United Kingdom. A century later they were 35,700,000 out of 47,300,000, or over 75 p.c. of the whole. The emigration from Ireland has been so great that there are three times as many Irish living in the U.S.A. as in the U.K.

While the population of the United Kingdom grew by about 2,100,000 in the intercensal period 1911-21, the increase was only about one-half that recorded in 1901-11; it is less, indeed, than any corresponding figure since 1811, and proportionately far lower than any previously recorded. This is due to three factors: (1) increased emigration in the years

1912-1914; (2) the war losses; (3) the loss of births through the war. In 1918 the excess of births over deaths fell to as low as 50,800.

The census of 1921 showed a check in the growth of Greater London and an actual fall in the population of the city and administrative county of London. The population of the L.C.C. area (74,850 acres) fell from 4,521,685 in 1911 to 4,483,249 in 1921, or by 0.9 p.c. The outer ring (368,599 acres) grew in population from 2,729,673 to 2,992,919, or by 9.6 p.c. Greater London as a whole (443,449 acres) grew in 1911-21 from 7,251,358 to 7,476,168, or by 3.1 p.c.; in the ten years 1901-11 it grew by 10.2 p.c.

In point of size next to the metropolis the chief towns are: Glasgow, 1,034,069; Birmingham, 919,438; Liverpool, 803,118; Manchester, 730,551; Sheffield, 490,724; Leeds, 458,320; Edinburgh, 420,281.

The British population, in common with that of other European nations, has long shown an excess of females over males. In 1821 the excess of females in the United Kingdom was 500,000; in 1851, 600,000; in 1911, 1,400,000. For 1921 in Great Britain alone the female preponderance was 1,720,802 as compared with 1,179,276 in 1911, the figures being greater in urban districts (1,114 females to 1,000 males) than in rural districts (1,025 females to 1,000 males).

These figures do not, as is sometimes said, correspond to a surplus of marriageable females. The cause of the excess of females is to be found in (1) the higher mortality of male infants; (2) the higher degree of risk to which men are exposed; and (3) the greater emigration of men than of women.

As regards occupations of the British people, a summary for 1911, compared with 1901, is as follows, the figures representing millions:

	1901	1911
(a) Unoccupied:		
Under 10 years of age	9.2	9.4
Aged 10 years and upwards, unoccupied or retired	14.0	15.6
Total unoccupied	23.2	25.0
(b) Occupied (working for gain)	18.3	20.2
Totals	41.5	45.2

The 20,200,000 persons occupied for gain in 1911 were: 14,300,000 males, and 5,900,000 females. The chief occupations in which males held a preponderance were:

Agriculture: males, 2,143,000; females, 119,000; total 2,262,000.
Metals, machines, etc.: males, 1,672,000; females, 94,000; total 1,766,000.

Transport: males, 1,659,000; females, 39,000; total 1,698,000.

Mines and quarries: males, 1,206,000; females, 8,000; total 1,214,000.

Building, road-making, etc.: males, 1,208,000; females, 5,000; total 1,213,000.

Food, tobacco, drink, and lodging: males, 1,070,000; females, 546,000; total 1,616,000.

Among occupations in which females held a preponderance were:

Domestic service (including laundry work): females, 2,043,000; males, 185,000; total 2,228,000.

Textiles: females, 938,000; males, 676,000; total 1,614,000.

Dressmaking, etc.: females, 898,000; males, 511,000; total 1,409,000.

Men solely were employed in defence, and the number of soldiers and sailors in the country on Census night, 1911, was 251,000. The central government employed 202,000 persons, and local authorities, 154,000, including police.

The other groups of the official analysis are: professions, 864,000; commerce, 944,000; fisheries, 62,000; jewelry, watches, instruments, and games, 254,000; wood, furniture, etc., 333,000; bricks, cement, pottery, glass, 188,000; chemicals, soap, oils, etc., 204,000; skins, leather, etc., 125,000; paper, printing, etc., 409,000; gas, water, drains, 99,000.

This analysis of the 20,200,000 occupied persons of 1911 does not distinguish makers from dealers; but light is thrown on the number of actual producers by the Census of Production of 1907, which collected information from employers. According to this important investigation the number of direct producers of material commodities, including salaried persons, engaged in fields and factories was no more than 10,500,000, of whom 8,000,000 were industrial workers, and 2,500,000 agricultural workers, including farmers.

BRITISH EMPIRE. The population of the British Empire in 1921 was estimated as:

United Kingdom	47,900,000
Self-governing Dominions	
Canada and Newfoundland	9,000,000
Australia	5,500,000
New Zealand	1,300,000
South Africa (Union of)	5,700,000
	21,500,000
Other parts of the Empire:	
Indian Empire	319,100,000
Ceylon	4,500,000
Egypt	13,000,000
Other possessions	40,000,000
	376,600,000
Grand total	445,400,000

Taking the population of the world as 1,769 millions, the British Empire, with its 445 million inhabitants, accounts for rather more than one-fourth of the whole. The European population

of the British Empire is approximately 65,000,000. The greater part of the entire Empire's population is formed by the Indian peoples, 72 p.c. of the whole. The latest estimate gives a total population of 449,370,000.

EUROPE AFTER THE GREAT WAR
The Great War made such changes in Europe that precise information cannot yet be given as to the distribution of the population in 1924. The facts of the case so far as they can be estimated may thus be summarised:

Country	Population	Date: Census or Estimate
United Kingdom	47.3	Cen. 1921
France	39.2	Cen. 1921
Italy	40.0	Est. 1921
Germany	60.4	Cen. 1919
Russia	105.0	Est. 1924
Spain	22.0	Est. 1923
Portugal	9.6	Est. 1924
Holland	7.0	Est. 1924
Belgium	8.0	Est. 1921
Switzerland	3.9	Cen. 1920
Norway	2.6	Est. 1921
Sweden	5.9	Cen. 1920
Denmark	3.3	Cen. 1921
Bulgaria	4.9	Cen. 1920
Rumania	15.0	Est. 1921
Ukraine	40.0	Est. 1921
Yugo-Slavia	11.6	Est. 1924
Greece	5.5	Est. 1921
Finland	3.3	Cen. 1918
Poland	27.0	Est. 1921
Lithuania, Latvia and Esthonia	5.0	Est. 1921
Austria	6.0	Cen. 1920
Hungary	8.0	Est. 1921
Czecho-Slovakia	13.5	Cen. 1921
Turkey	2.0	Est. 1921
Albania	0.8	Est. 1921
Malta, Channel Is., Danzig, Luxemburg, etc.	0.9	Est. 1921
Total Europe	497.7	

France has now, with Alsace-Lorraine, a population of 39,200,000. In 1911, without Alsace-Lorraine, the population was 39,600,000.

Germany, at the census of 1919, had a population of 60,400,000, including all Silesia. At the census of 1910 the figure was 64,900,000, including Alsace-Lorraine, Danzig, etc. The war has raised the excess of females in Germany, at the ages 20-45, to as many as 2,800,000; before the war it was about 800,000.

The Italian estimate above is for 1921; the figure 40,000,000 for the new Italy (1924) may be accepted as a fair estimate.

The splitting up of the Dual Monarchy gives some interesting figures. Austria is reduced to 6,000,000; Hungary to about 8,000,000. Czecho-Slovakia is estimated to number 13,500,000, and Yugo-Slavia to number 11,600,000.

Rumania, which before the war numbered 7,300,000, by addition of territory now reaches about 15,000,000.

THE WORLD

ASIA

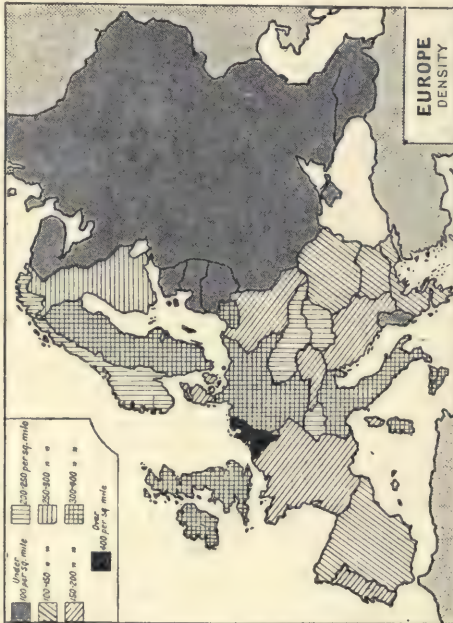
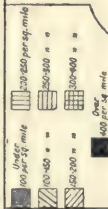
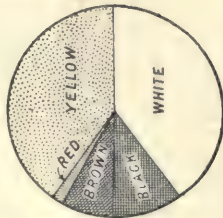
EUROPE

AMERICA

AFRICA

AUSTRALASIA

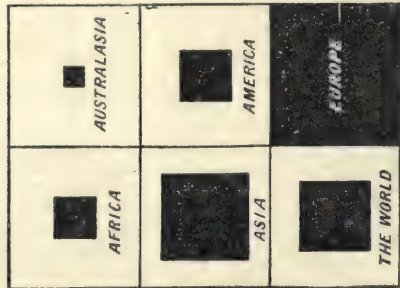
Left, comparative numbers of white, yellow, black, brown, and red races. Below, left, densities of population in European basins; right, map showing density of European countries



CHINA

BRITISH EMPIRE

THE WORLD



Black bars on top represent actual populations of world and continents; shaded bars, how each continent would be peopled if world population were divided proportionately to territory. Bottom, right, black bars show relative populations of chief countries; shaded upright column, proportionate populations of England, Scotland, Ireland, and Wales; and on right, men and women in U.K.

POPULATION : DIAGRAMMATIC REPRESENTATION OF THE DISTRIBUTION, DENSITY, GROWTH, AND RELIGIONS OF THE WORLD



Left, growth of population in U.K. Right, comparison of population of U.K., British Empire, and the world. Below, chief religions of the world



Christian Mahomedan Confucian Hindu Buddhist Taoist Shintoist



CHIEF OCCUPATIONS IN U.K. U.S.A.

RUSSIA

The pre-war Greece had some 2,600,000 people; by the treaty of Sévres, 1920, about 5,500,000.

The figure given for Russia, 105,000,000, is based on a Soviet census, but partly estimated. Poland is estimated to have 27,000,000 people. Turkey in Europe, reduced to under 2,000,000 in 1920, advanced in 1923.

ASIA. The Asian populations form nearly one-half of all the world's people, including:

Country	Population	Date: Census or Estimate
Indian Empire	319-1	Cen. 1921
China	330-0	Est. 1921
Japan	56-0	Cen. 1921
Japanese Pos. ..	20-7	Cen. 1921
Java	50-0	Est. 1921
Russia	30-0	Est. 1921
Ceylon	4-5	Est. 1921
Other Countries	87-3	Est. 1921
Total Asia	897-6	

For China, estimates as large as 425,000,000 have been made and published, but the figure given, 330,000,000, is probably nearer the truth. India and China are almost at parity in population, and between them form in all likelihood rather more than one-third of the world's population.

The growth of Japan is very notable, for at the count of 1908 the estimate was 49,600,000. In 1921 Japan proper had 56,000,000 people, and the Japanese Empire numbered 76,700,000.

The "other countries" not named in the above table include: The Philippines 8,300,000 (1910); Siam 9,000,000 (est. 1921); Persia 9,500,000 (est. 1920); French Indo-China 14,600,000 (Census 1911); Irak (Mesopotamia) 1,400,000 (est. 1921); Afghanistan 5,000,000 (est. 1921).

AFRICA. Africa has perhaps 150,000,000 people, including Egypt 13,000,000 (est. 1921); The Union of South Africa 5,700,000 (est. 1921); British West Africa, including Nigeria, over 20,000,000 (Census 1911); The Belgian Congo 15,000,000 (Census 1909); Algeria 5,600,000 (Census 1911); Madagascar 3,200,000 (Census 1911); Tanganyika 7,500,000 (Census 1912); Abyssinia 10,000,000 (est. 1921); Libya 1,000,000 (Census 1910); Morocco 5,000,000 (est. 1921); Tunis 1,900,000 (est. 1911); Uganda, 3,300,000 (est. 1919); Kenya Colony, 2,800,000 (est. 1920); Anglo-Egyptian Sudan, 3,400,000 (est. 1917); French Equatorial Africa, 9,000,000 (est. 1915); French West Africa, 11,500,000 (est. 1920); Angola, 4,000,000 (est. 1920); Mozambique, 3,000,000 (est. 1920).

AMERICA. The population of the American continent is growing very rapidly. In addition to the great natural increase of the resident population, there is much immigration from the Old World, especially from Central and E. Europe. The chief constituents are:

Country	Population	Date: Census or Estimate
a. North America:		
United States	105-7	Cen. 1920
Canada and Newfndland	9-0	Est. 1921
Mexico	18-0	Est. 1921
Alaska	0-1	Cen. 1910
	132-8	
b. South and Central America:		
Argentina	9-0	Est. 1921
Brazil	30-6	Cen. 1920
Chile	4-2	Est. 1921
Peru	5-0	Est. 1921
Bolivia	3-0	Est. 1921
Cuba	2-3	Cen. 1911
British West Indies	1-7	Cen. 1911
Colombia	5-5	Cen. 1912
Other States	22-6	Est. 1921
	83-9	
Total all America	216-7	

AUSTRALASIA AND OCEANIA. The populations of Australia and New Zealand have been given. The remainder of Australasia, including New Caledonia (French) and the scattered territories we call Oceania, are estimated to have a population of about 600,000 persons. This division of the world has, therefore, a population of about 7,400,000.

THE WORLD'S PEOPLE. The population of the world (1924) is approximately as follows:

Continent	Population
Europe	497,700,000
Asia	897,600,000
Africa	150,000,000
America	216,700,000
Australasia and Oceania	7,400,000
The World ..	1,769,400,000

The margin of error in this estimate is actually large, but relatively not very great. It conveys an accurate conception of the magnitude of the world's population. According to this computation the world as a whole contains about 38 times as many people as live in the United Kingdom.

Bibliography. Census Returns: Elements of Vital Statistics, A. Newsholme, 3rd ed. 1899; The Growth of Nations, W. Rose Smith, 1909; Birth-rate and Empire, T. Marchant, 1917; Vital Statistics, An Introduction to the Science of Demography, G. C. Whipple, 1919; The Census and Some of its Uses, G. T. B. Smith, 1921.

Populist. Political party in the U.S.A., first formed in 1891. The leading points in its programme were: free coinage of silver, national ownership of railways, and a graduated income-tax. In 1896, and again in 1900, it nominated for the presidency William J. Bryan, who was already the nominee of the Democratic party; but on neither occasion was he elected. After 1900 the party, chiefly drawn from the agricultural and industrial classes, gradually ceased to be an active political force.

Porbandar. Native state and town of India, in Kathiawar, Bombay prov. The state lies along the Arabian Sea in the S.W. peninsula of Kathiawar. The town has a harbour and a terminus of the rly. S.W. from Mehsana, Baroda. Only small vessels can use the port on account of the bar. Its area is 636 sq. m. Pop., state, 91,000; town, 24,800.

Porcelain. Fine pottery distinguished from earthenware by being a vitreous translucent substance coated with a hard transparent glaze. It was discovered by the Chinese, wherefore it is often called china, and attained great perfection during the Ming dynasty, 1368-1644. The Japanese also have made porcelain for many centuries. It was not introduced to Europe until the late 17th and 18th centuries, France preceding Germany, and England following quickly. In each country it has been a new invention dependent upon the discovery of the correct material at hand, the product thus varying considerably. Laboratory porcelain made in Germany before the Great War was a considerable industry, but in 1916 it was established in England. See Pottery.

Porch (Lat. *porticus*). In building, an enclosed place of entrance and exit projecting from the main mass, sometimes as the lower part of a pavilion the whole height of the structure. The church porch originated in the narthex (*q.v.*). The Gothic porch of parish churches was frequently constructed of timber. In civil and domestic architecture, the term includes the gabled cottage porch, and the verandah screening the entrance to a house in the "colonial" style. See Basilica; House; illus. next page.

Porch, THE. Name given to the Stoics and their philosophy. The school was founded about 310 B.C. by Zeno of Citium, in Cyprus, who lectured in the market place at Athens in the Stoa Poekile, the painted porch (or, rather, colonnade), adorned with paintings by Polygnotus. See Stoicism.



Porch. Examples of the porch in principal styles of architecture. 1. Culver Homestead, New York, U.S.A., Colonial style. 2. Parish church, Cley-next-the-Sea, Norfolk, Late Perpendicular Gothic. 3. Old School House, Weobley, Herefordshire, English half-timber. 4. Church of S. Mary-le-Strand, London, Classic, designed by Gibbs. 5. Woolwich Town Hall, modern Classic. 6. Cranbourne Manor House, Dorset, English Renaissance. See previous page

Specially drawn for Harmsworth's Universal Encyclopedia by Harold Oakley

Porchester OR PORTCHESTER. Village of Hampshire, England. It stands on Portsmouth Harbour, 7 m. from Portsmouth, with a station on the L. & S.W. Rly. Its interest is mainly historical. An important Roman station, and later a prosperous seaport, it was one of the chief stations of the navy until the receding of the sea made it useless as a port. Of the Norman castle built in the 12th century, within the walls of the old Roman fortress, there are remains, including the keep. S. Mary's Church, also of the 12th century, has been largely restored.

Porcupine (Fr. *porc*, pig; *épine*, prickle). Rodent mammals of the family Hystricidae, distinguished by the possession of a defensive armour of hollow quills and spines. They are distributed over large areas of S. Europe, S. Asia, Africa, and America. The common porcupine (*Hystrix cristata*), found in both Europe and Africa, is a bulky animal about 27

inches in length, and has black hair with a white crest on the head and band on the neck. The quills are ringed with black and white, and are of great length. The shorter open quills on the tail seem to serve the purpose of rattles to warn any animal who proposes to molest the porcupine. These animals generally occur in hilly districts, and spend the day in burrows or in clefts in the rocks, feeding at night upon roots and vegetables, and often doing great damage in gardens. When attacked, they rush backward at their foe, and can inflict very severe wounds with their quills.

The porcupines of America are very different in appearance, having short quills and long tails, which in the tree porcupines of S. America are prehensile. As the quills are barbed at the tips and are loosely attached to the skin, they make serious wounds by working their way into the flesh of the animal attacked, and are difficult to

extract. The Canadian species (*Erethizon dorsatus*) makes very effective use of its thickly quilled tail as a weapon. These porcupines climb well and spend much of their time in the trees, where they strip off the foliage in addition to eating the bark. They make their home in hollow trees and in rock crevices.

Porcupine Grass (*Spinefex*). Small genus of grasses of the tribe Panicaceae, three species natives of Australia, and one native of tropical Asia. The leaves are in the form of spines, which inflict terrible sufferings on man or beast



Porcupine Grass. Spiny leaves and flower

venturing among the grass. Horses and dogs are badly lamed by it, and wallabies and kangaroos avoid ground covered by it.

Pordenone, It. Name taken by the Italian painter, Giovanni Antonio Licinio (1483-1539). Born near Pordenone, Venetia, he studied under Pellegrino da San Daniele at Udine, but he was at Mantua in 1520, at Venice in 1528, and at Piacenza in 1529, settling at Venice in 1536, where he proved a rival to Titian. His frescoes in Treviso Cathedral and the altarpiece of The Trinity for the cathedral of San Daniel are noteworthy. See Licinio, G. A.

Porifera. Sub-kingdom or phylum of animal life consisting of the various forms of sponges. In this phylum we first meet with simple cellular organisms, such as constitute the Protozoa, being aggregated to form tissues. See Sponge.

Porism (Gr. *porizein*, to bring about, deduce as a corollary). In ancient mathematics, one of the divisions into which propositions in geometry were divided, the other two being theorems and problems. In a porism it was required to find something, e.g. the centre of a given circle; a problem required something to be done, e.g. the construction of a circle in a given triangle; while a theorem was something to be demonstrated, e.g. the tangents from any point to a circle are equal.

Pork (Lat. *porcus*, hog). Uncured flesh of the hog. In Great Britain by far the greater part of the consumption of the flesh of the pig is in the form of bacon. Still there is a considerable demand for fresh and salted pork, which is

met to a large extent from home supplies, and partly from Holland and Belgium, and to some extent from America. This demand was increased in the year before the Great War by the admission of pork into the diet of the army and navy. In the United States, and in Canada, pork is a standard and favourite article of diet. Pork and beans is a staple food.

The United States is the greatest hog-producing country in the world, and the demand of the Allies for food during the Great War led to an enormous increase in the numbers, which rose from 61 million in Jan., 1913, to 75½ million in 1919. This increase was fostered by the American Food Administration, as a pig can be brought, under good management, to the slaughter stage in a little over six months, and pig-keeping is regarded as the most economical way of using surplus grain. The greater part of American production is absorbed in the States, but the exportable surplus was raised to 20 p.c. during the war. The greater part of the export of the hog slaughter-houses of Chicago to England was, however, in the shape, not of pork, but of bacon. Attempts were made before the war to encourage the export of salted pork from China.

Pork is a forbidden food both to the Mahomedan and the Jew, perhaps originally because it deteriorates rapidly in hot weather, and is therefore unsuited for use in the climate of the Mediterranean countries. Hutchison (Food and Principles of Dietetics) states that the comparative indigestibility of pork is shown by the fact that 3½ oz. required 3 hours for their

digestion, as compared with 2 hours for beef. The difficulty is said to be due to the large accumulation of fat between the fibres. The fat of bacon, on the other hand, is digestible because of its granular composition. Medium fat pork contains 60.9 p.c. of water, 12.3 p.c. protein and gelatin, 26.2 p.c. fat, and 0.6 p.c. ash. In very fat pork the percentage of protein and gelatin may be as low as 9.7 p.c., and the fat content as high as 45.5 p.c.

Porlock. Village of Somerset, England. It is 6 m. from Minehead, on the edge of Exmoor, about a mile from the coast. The church of S. Dubritius is an old building restored. Near are West Porlock and Porlock Weir. Porlock Bay is an opening of the Bristol Channel, about 4½ m. across. Before the sea receded, Porlock was a flourishing seaport and a market town. Pop. 700.

Porosity. Term used to express the fact that no matter completely fills the space it occupies. This is hypothetically true on the hypothesis that matter consists of atoms which necessarily have spaces in between them, and is practically shown by the fact that all matter is compressible. Some substances are obviously porous, e.g. earthenware, pumice stone, blotting-paper, etc., while others, as water, metals, etc., have very fine pores and consequently are not easily compressed.

Porphyrites. In geology, name given to certain types of igneous rocks. They are intrusive rocks of porphyritic texture, occurring as dikes and sills, and their felspar is plagioclase. Rocks of this class are usually grey in colour with phenocrysts of plagioclase felspar, hornblende, biotite, or augite, and are found in Scotland, Wales, N. America, the Swiss Alps, etc.

Porphyritic Structure. In geology, name given to a particular rock formation. It is characterised by the occurrence of two distinct series of crystals. One series forms a ground mass of extremely fine crystals, in which the other series of large well-formed crystals is embedded. These latter crystals are called phenocrysts. Rocks of this class often make beautiful ornamental stones.

Porphyrius or **PORPHYRY** (A.D. 233-304). Neo-Platonist whose real name was Malchus (king). Born at Batanea in Syria, he spent most of his life in Rome, where he was a pupil of Plotinus, whose literary remains he edited with a biography. In one of his works he discusses the problem of the nature of universals, much debated during the Middle Ages. He died at Rome. He was a bitter anti-Christian.

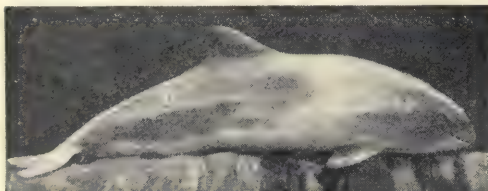


Porcupine. 1. Brush-tailed African variety, *Atherura africana*. 2. Crested, and, 3. Long-tailed porcupines, European varieties. 4. Brazilian tree porcupine, *Synotheres prehensilis*

W. S. Burridge, F.R.S.

Porphyry (Gr. *porphyra*, purple, fish). In geology, name given to igneous rocks of varying composition. The famous red porphyry used by the Romans for an ornamental stone is obtained from quarries at Jebel Dukhan, in Egypt, near the Red Sea, the site of which was long lost. Cut and polished, the rock shows bright red or white spots on a deep red background, and black or dark brown patches of hornblende, etc. The colour of the rock is due to the part conversion of the plagioclase feldspar into thulite and manganese epidote. Granite porphyries contain orthoclase, quartz, and mica, and are generally pink to grey; while syenite porphyries are almost lacking in quartz. A green variety of porphyry has a large proportion of epidote and chlorite in its composition, and was often used with the red porphyry as a contrasting ornamental stone, especially for objects of art and interior decorations. The green variety is found in Peloponnesus, and at Lambay Island, near Dublin.

Porpoise (Lat. *porcus*, hog; *piscis*, fish). Genus of aquatic mammals belonging to the order Cetacea or whale-like animals. The common porpoise (*Phocaena*



Porpoise. Common species, *Phocaena communis*, found off the coasts of Britain

communis) is about 5 ft. to 8 ft. long, is blackish on the upper parts and white below, and in form resembles a miniature whale, but has a more sloping head. It is found in herds or schools off the British, Scandinavian, and American coasts, frequently sporting on the surface of the water, and occasionally ascends the larger rivers. It lives on fish, and does damage at times to the herring and mackerel fishery, besides occasionally killing salmon. Formerly a popular article of food, esteemed a royal dish down to the days of Queen Elizabeth, its flesh being said to resemble pork, it is now killed mainly for its oil, a fine specimen yielding about three gallons. The so-called porpoise hide used for making boots and laces is the product of the white whale. See Mammal; Narwhal.

Porpora, NICCOLO ANTONIO (1686-c. 1767). Italian composer and music master. Born in Naples,

Aug. 19, 1686, he there produced his first opera, *Basilio*. For a time director of the Conservatoire at Vienna and master of the music to the king of Poland, he composed many operas, some oratorios, cantatas, masses, etc., and, in opposition to Handel, conducted the opera in London. His greatest successes were gained as a teacher.

Porras, BELISARIO (b. 1856). Panama statesman. Born Nov. 28, 1856, he was educated at



Belisario Porras, Panama statesman

Bogotá and Brussels. From law he entered politics, represented Colombia in Belgium and Italy, and on the formation of the Panama republic in 1903, became its minister in Brazil. Delegate to the third Pan-American Congress, he became president of Panama, 1912-16, represented the republic in the U.S.A., and in Aug., 1920, again became president.

Porridge. Farinaceous dish made with various meals such as lentils and hominy, but more especially with oatmeal. A good way to make porridge is to soak the oatmeal in cold water overnight, and in the morning to strain off the water, boil it, and add the moistened oatmeal. It will then require about twenty minutes' gentle cooking with stirring all the time. About 4 oz. of oatmeal will go to a pint and a half of water. A little salt should be added. The word is a corruption of pottage, Fr. *potage*, soup cooked in a pot.

Porsanger. Fiord penetrating the N. coast of Finmark, Norway. It runs S. from the island of Magerö, S.E. of the North Cape. Its length is about 80 m. and its average width 10 m.

Porsena or PORSENNA, LARS, King of Clusium in Etruria. According to the Roman legend, he led his army against Rome to restore to his throne the exiled Tarquin. An attempt to storm the city was defeated by the valour of Horatius Cocles (*q.v.*). Porsena now establishing a blockade of the city, a young Roman, C. Mucius Scaevola, entered his camp and attempted to murder him. Seized and tortured, Scaevola (*q.v.*) displayed such astonishing fortitude

that Porsena abandoned the siege and made terms with the Romans. Modern historical research has pronounced this legend a fabrication to conceal the complete defeat of the Romans by the Etruscans.

Porson, RICHARD (1759-1808) English scholar. Born at East Ruston, Norfolk, Dec. 25, 1759, the son of a parish clerk, his unusual gifts, especially his marvellous memory, attracted attention, and through the good offices of John Norris, of Witton Park, he was sent to Eton, whence he proceeded to Trinity College, Cambridge, where he had a brilliant career ending with election to a fellowship. Declining to take orders within the specified time, Porson lost his fellowship in 1792, but friends provided a fund to enable him to continue his studies at the Temple. In the same year, however, he was elected regius professor of Greek at Cambridge, but continued to live in the Temple, and in 1806 he was made librarian of the London Institution. He died Sept. 25, 1808. Porson accomplished comparatively little, owing to his indolent disposition and intemperate habits. Among his works are editions of Aeschylus and of some of the plays of Euripides. In the acuteness of his textual criticism he has had few equals. See Life, J. S. Watson, 1861.

Porson Prize. Annual prize awarded to undergraduates of Cambridge University for the best translation of a passage of English poetry into Greek verse. Founded in honour of Richard Porson, it was first awarded in 1817, and can be won more than once by the same person.

Port. Abbrev. for seaport, and as such used for Liverpool, London, and other seaports. Strictly the port is only that part of the place which is devoted to ships and shipping, and is under a separate port authority. This use accounts for the presence of the word in many place-names, e.g. Portsmouth. The term portreeve was used in past days for the official, akin to the sheriff, who looked after the affairs of a port for the king. (See Docks; Harbour; London, Port of.) In nautical language port is the left-hand side of a ship when looking forward. Port tack is when a ship is making a leg with the wind blowing on her port-side. See Navigation.



Richard Porson, English scholar

Port Adelaide. Seaport of S. Australia. It stands on an estuary of the Gulf of St. Vincent, and has an excellent harbour and docks accommodating ocean liners. It is a port of call for mail steamers for Europe and Asia, for both Suez and S. African routes. Wheat and other agricultural products are exported. Pop. 24,000.

Portadown. Market town and urban dist. of co. Armagh, Ireland. It stands on the Bann, 25 m. from Belfast, with a station on the G.N. of I. Rly. It is a railway junction, a river port, has manufactures of linen and other textiles, and a trade in agricultural produce. Market days, Tues., Wed., and Sat. Pop. 11,700.

Portaels, JEAN FRANÇOIS (1818-95). Belgian artist. Born in Brabant, April 30, 1818, he studied art in Brussels and then in Paris. In 1841 he won the grand prix de Rome, and in 1847 became head of the art academy at Ghent. For some years he conducted an art school in Brussels, until in 1878 he was made director of the academy there. His many works include portraits, female figures, and studies of Biblical characters and Oriental life. Through his pupils he exercised a great influence on Belgian art. He died in Brussels, Feb. 8, 1895.

Portage (Fr. *porter*, to carry). Act of carrying something, also the charge made for the carriage of goods. In N. America a break in the chain of water communications is called a portage because here the goods have to be transferred from the canoes and carried. Portages are often caused by rapids and waterfalls. Many places in N. America bear the name of Portage, e.g. Portage la Prairie, but this is but a relic of their past, as the cutting of canals and the building of railways have done away with these obstacles to transport.

One of the most important of these portages was in Wisconsin over the tract of land between the rivers Fox and Wisconsin, which here are only 2 m. from each other. The best route from Lake Michigan to the Mississippi lay along these rivers, and the portage between them was regularly used by Indians and later by Europeans.

Portage. City of Wisconsin, U.S.A., capital of Columbia co. It is at the head of navigation on the Wisconsin river, 30 m. N. of Madison, and is served by the Wisconsin Central and other rlys. and by the ship canal between the Wisconsin and Fox rivers. There is steamboat communication with Green Bay. Pop. (1920) 5,600



Port Adelaide, South Australia. Harbour and wharves of the third port in the Australian Commonwealth

Portage La Prairie. City of Manitoba, Canada. Situated 56 m. W. of Winnipeg, it is served by the G.T., G.T.P., C.N., and C.P. Rlys. It is the centre of a famous farming district, and its industries include flour and brick making and grain elevators. Pop. 6,500.

Portalegre. Dist. of E. Portugal. Bounded E. by Spain and N. by the Tagus, its area is 2,405 sq. m. Mountainous in the N.E. and S., it is elsewhere level and contains the Campo de Benavilla in the S.W. It is traversed by two rly. lines from Lisbon to Spain. Wheat, coal, oil, and wine are produced; pigs are reared and textiles are manufactured. Pop. 142,000.

Portalegre. City of E. Portugal. The capital of Portalegre dist., it is 8 m. N. of its station on the Lisbon-Badajoz rly. The cathedral, founded 1556, contains fine wood sculptures. The neighbourhood is rich in prehistoric and Roman remains. Woollens are manufactured and cork is obtained locally. It is the ancient Ammaia. Pop. 11,600.

Port Alfred. Seaside resort of the Cape Province, S. Africa. It stands at the mouth of the Kowie river, and is connected by rly. with Grahamstown. It has a public library. The attractions include boating, golf links, and a racecourse. There have been attempts to make the place a seaport, £800,000 having been spent for this purpose, but it has not been possible to remove the bar at the river mouth. Pop. 1,900.

Portal System. Circulatory system formed by veins from the intestine and certain other abdominal organs, which unite to form a trunk, the portal vein. This passes into the liver, where it again divides into smaller vessels.

Portamento (Ital., carrying). Musical term for a vocal effect obtained by sliding from one note to another. Used with restraint it is a legitimate means of expression, but it may easily be vulgarised, and as frequently employed by

untrained singers it is a fruitful source of faulty intonation.

Port Antonio. Seaport town of Jamaica. Situated on the N.E. coast, 28 m. N.E. of Kingston, with which it is connected by rly., it has two good harbours, and is the chief exporting centre for the Jamaica banana trade. Pop. 7,100.

Portarlinton. Market town of Ireland. It is partly in King's co. and partly in Queen's co., and stands on the Barrow and a branch of the Grand Canal. It is 42 m. from Dublin and 10 m. from Maryborough, with a station on the G.S. & W. Rly., on which line it is a junction. Near the town are Emo Park and the ruins of Lea Castle. The name was given when the town became the property of the earl of Arlington in the 17th century; previously it was called Colto-dry. Made a borough in 1667, it sent two members to the Irish parliament until 1800, and one to the imperial parliament until 1885. In 1685 a body of Protestant exiles from France settled here. Market day, Wed. Pop. 2,000.

Portarlinton, EARL OF. Irish title borne since 1785 by the family of Dawson, now Dawson-Damer. William Henry Dawson, a landowner in Queen's county, and a member of the Irish parliament, was made Baron Dawson in 1770, and Viscount Carlow in 1776. His son John, the 2nd viscount, was made an earl in 1785. John, the 2nd earl, a soldier, succeeded to the estates of George Damer, earl of Dorchester, and Henry, the 3rd earl, took that name. He was succeeded in 1889 by his cousin, Lionel, from whom the present earl is descended. The family seat is Emo Park, Portarlinton, and the earl's eldest son is known as Viscount Carlow.

Port Arthur. Port and town of Ontario, Canada. It stands at the head of Lake Superior, 991 m. from Montreal and 423 m. from Winnipeg, and is served by the C.P., C.N., and G.T. Rlys. It has a fine harbour ships quantities of



Port Arthur, Canada. Docks and railway wharves

grain to Montreal and elsewhere, and in addition to large grain elevators, has shipbuilding yards, sawmills, blast furnaces, foundries, etc. Pop. 18,500.

Port Arthur OR LUSHUN. Fortified seaport at the S.W. end of the Liao-tung peninsula, Manchuria. It is a terminus of the Siberian rly. system, and has a secure harbour ice-free throughout the year. Pop. 14,000.

The fortress was captured twice by the Japanese; in 1894 from China; and from the Russians in 1904-5. In 1894 its inadequate fortifications were speedily taken by a Japanese army under Oyama, which commenced to land at Pitsze-wo on October 24, rapidly carried Kinchow and Talienwan, and on Nov. 17 moved forward to attack, assaulted and carried the W. defences at dawn, and entered the town. By 3 p.m. all resistance was at an end. At the peace, Port Arthur was ceded to the Japanese, but European pressure compelled them to restore the town to China.

In 1898 Port Arthur was leased to Russia with the neighbouring port of Talienwan. It was connected by railway with Mukden, gradually converted into a Russian stronghold, and became the principal base of the Russian eastern fleet. By 1904 the continuous enceinte had become obsolete, and the main line of defence was on the outer edge of the amphitheatre of hills 2,000 to 4,000 yards from the harbour, with eight permanent, detached forts. In between were semi-permanent works on every

knoll, connected up by several lines of trenches for a circumference of about 12 miles. The most obvious weakness was that 203-metre hill, about 5,000 yards N.W. of the New Town and harbour, overlooked both, and had no permanent works, though there were strong semi-permanent works; 174-metre hill, 1,500 yards beyond, was also held.

From the outbreak of the Russo-Japanese War, Togo blockaded the harbour. When the Japanese, after the battle of Nanshan on May 26, 1904, cut off communications with the north, General Stössel was left in command with a garrison of some 47,000 men. After Nanshan, the siege was entrusted to the Japanese 3rd army under Nogi, which commenced to land on June 1. Dalny was seized without fighting, and a month was spent in preparing this port as a base.

Stössel had taken up a strong position outside his defences, from which he was dislodged on June 26, but on July 3 and 4 he made a counterstroke which delayed the Japanese. On July 26 Nogi advanced, and after two days' fighting, July 27 and 28, he forced Stössel to withdraw inside his line of defence. Nogi commenced a three days' bombardment on Aug. 19, and made a determined assault on the N.E. front on the 21st and 22nd, which failed, and Stössel made a counter-attack on the 23rd and 24th. On Oct. 1 the Japanese brought into action 11-inch howitzers after an abortive attempt to capture 203-metre hill.

From Oct. 26 to Nov. 2 furious assaults were made without substantial results, but on Dec. 5, powerfully aided by the 11-inch howitzers and other artillery, 203-metre hill was captured. One by one during Dec. the permanent works on the northern front were crushed by the howitzers, and a gap was made in the defences. The garrison had begun to lose heart when General Kondratenko, who had been their mainstay, was killed on Dec. 15, and on Jan. 2, 1905, Stössel surrendered, having only 24,000 effectives and 15,000 wounded and sick left out of his 47,000. The Japanese paid heavily for their success, losing 92,000 men, 58,000 killed and wounded, as well as 34,000 sick.

By the treaty of Portsmouth, New Hampshire, 1905, Port Arthur was ceded by the Russians to Japan, and in 1915 the Chinese extended the lease for a further period of 99 years. During the occupation by Japan important rly. construction has been undertaken in the Liao-tung peninsula, Mukden being connected with Antung on the Yalu river, and a branch line built by joint Chinese and Japanese enterprise from Kwanchengtze to Kirin in central Manchuria. See Russo-Japanese War.

Portative Organ. Medieval musical instrument. It was a small pipe organ which could be carried about by the performer, who worked the bellows and manipulated the keys somewhat as the accordion is played. See Organ; Positive Organ.

Port Augusta. Seaport in S. Australia. It stands at the head of Spencer Gulf, 259 m. N. of Adelaide by rly., and is the starting point for both transcontinental rly. routes, the one completed to Kalgoorlie, 1,000 m. away, and the other completed as far as Oodnadatta with proposed connexion to the rly. S. from Darwin, in N. Territory. It is the outlet of a district of gold, silver, copper, iron, and coal mines, and of a pastoral area producing wheat and wool. Ostrich farming is carried on. Pop. 1,500.



Port Arthur, Manchuria. Town and docks seen from across the East Harbour; on the left is the passage to the open sea, and beyond it the West Harbour

Port au Prince.

Capital and chief seaport of Haiti, West Indies. Situated on the W. coast, at the head of the Gulf of Gonaïves, it contains a cathedral, and has a secure harbour. Trade largely consists of the shipment of coffee, hides, and logwood. Pop. 120,000. *See* Haiti.

Port Bannatyne.

Watering-place of Bute-shire, Scotland. It stands on Kames Bay, 2 m. from Rothesay. The chief industry is fishing. John Sterling was born here. Near is Kames Castle. Mainly a 14th century building, it became the property of the marquess of Bute. Known also as Kames, it must be distinguished from Kames in Berwickshire, the birthplace of Lord Kames (*q.v.*).

Port Blair. Penal settlement of the Andaman Islands, in the Bay of Bengal. It is situated on South Island, one of the Great Andamans, and receives convicts from India. *See* Andaman Islands.

Portbury. Village of Somerset, England. It is 9 m. from Bristol, and stands near the Avon. The chief building is S. Mary's Church. In 1916 a national shipyard was established here. Pop. 500.

Port Chalmers. Port of South Island, New Zealand. Situated 8 m. from Dunedin, for which it is the deep water port, 190 m. from Lyttelton and 1,343 m. from Melbourne, it has graving docks, etc. Pop. 2,700.

Port Chester. Village of New York, U.S.A., in Westchester co. It stands on Long Island Sound, 25 m. N.E. of New York, and is served by the New York, New Haven and Hartford Rly. It is a residential village and a popular summer resort. Settled about 1743, it was incorporated as a village in 1868. Pop. 16,600.

Port Clarence. Small port, Durham, England, on the N. side of the mouth of the Tees, 4 m. N.E. of Stockton, on the N.E. Rly. Coal is exported and salt is manufactured. A ferry connects Port Clarence with Middlesbrough.

Portcullis (Fr. *porte*, gate; *coulisse*, a groove). In military architecture, a strong, timber-framed grating like a harrow, made to slide up and down in stone grooves in the portals of fortified castles. The vertical spikes were pointed with iron at the bottom, so as to strike into the earth or to



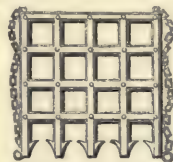
Port au Prince. Former national palace where President Lecomte was burned to death, Aug. 7, 1912

pierce the bodies of those attempting to force an entrance. The port-



Port Bannatyne, Buteshire. The town and bay from the west

cullis was a feature of early Norman and later medieval strongholds. In a long entrance passage there was frequently a succession of them. *See* Castle; Fortification.



Portcullis. Defensive grating of medieval castles

Port de la Paix. Town and seaport of Haiti, West Indies. It stands at the mouth of the Trois Rivières, on Tortuga Channel, and carries on a trade in coffee, cocoa, etc. Pop. 10,000.

Port Durnford. Inlet of Kenya Colony, 250 m. N. from Mombasa. It is also the name of a harbour in Natal at the mouth of the Umlatosi (Umhlutuzi) river, where is a government plantation for the supply of rly. sleepers.

Porte or **SUBLIME PORTE.** Term used for the government of Turkey. It comes from an Arabic word for gate which was translated into French as *porte*, and thus passed into general use in Great Britain. This special use of the word bears relation to the Eastern custom of using the gates of cities and royal palaces as places where justice was administered. *See* Turkey.

Porte, John CYRIL (1884-1919). British inventor. He entered the navy in 1898, and on the introduction of flying turned his attention to aeronautics, and in 1909 began building biplanes. Invalided out of the navy in 1911, he went to America, where he engaged in the commercial side of aeronautics. Returning to England in 1914, he became a commander in the R.N.A.S., and in 1915 took part in the raid on Bruges, Zeebrugge, and



John C. Porte, British inventor
Elliott & Fry

Ostend. He then devoted himself to the construction of flying boats and invented a series of Porte machines. He died Oct. 22, 1919. *See* Flying Boat.

Port Edgar. Harbour of the British crown colony of the Falkland Islands. It is situated on the S.E. coast of the island of W. Falkland.

Port Elizabeth. Seaport of Cape Province, S. Africa. It stands on Algoa Bay, 712 m. from Johannesburg and 664 from Cape Town, with both of which it is connected by rly. The Baakens river runs through the town. The chief buildings are the town hall, public library, museums, post office, and hospital. The churches include the Roman Catholic cathedral and S. Mary's, an Anglican centre. The market buildings contain large halls, one being known as the feather market hall.

The town has a theatre, opera house, and drill hall. There are three public parks, St. George's, Victoria, and Prince Alfred. To the N. of St. George's Park is an old Scottish cemetery. The town, which is served by electric tramways, is a shipping and distributing centre, and has no enclosed harbour, goods being landed at modern jetties. The roadstead, however, is sheltered. In 1859 it was found necessary to remove the breakwater, but early in the 20th



Port Elizabeth, South Africa. Plan of the central district of the seaport on Algoa Bay

century plans were put forward for an elaborate harbour. The manufactures include boots, flour, jam, etc. It is important, too, as an ostrich market, as here the feathers and wool are sold.

About 2 m. W. is the seaside resort of Humewood. Port Elizabeth, frequently called Algoa Bay, was originally Fort Frederick, a fort erected to guard the roadstead, and named after Frederick, duke of York. In 1820 it was settled by a number of British immigrants, and the town was laid out, being named after Elizabeth, the wife of Sir Rufane Donkin, then governor of the Cape. It was made a borough in 1836. Pop. 37,000, about half whites.

Porteous Riots. Two affrays between the Edinburgh populace and the

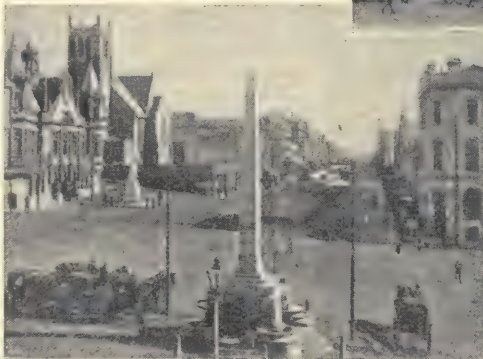
city guard in 1736. At the execution on April 14 of a smuggler named Wilson, who had robbed the Pittenweem custom house, the crowd assaulted the guard, which, led by its captain, John Porteous, opened fire, killing five or six persons. Porteous was convicted of murder but respited, and the citizens dragged

him from the Tolbooth prison and hanged him in the Grass Market on Sept. 7. None of the rioters, who were protected by influential people, were arrested. The Lords demanded severe penalties for the disaffected city, which were reduced by the Commons to the dismissal of the provost and a payment to Porteous's widow. Scott described the affair in *The Heart of Midlothian*.

Porter. Word used in two senses: (1) From *Fr. porter*, to carry, one who carries parcels, boxes, etc., e.g. a rly. porter whose primary duty is handling goods in transit; (2) from *Lat. portarius*, *Fr. portier*, a door or gate keeper, e.g. hall-porter.

Porter. Dark, bitter beer, brewed from browned malt, containing from four to six p.c. of alcohol. It was largely drunk by market porters in the 18th century, and was so named about 1750. See *Brewing*.

Porter, DAVID DIXON (1813-91). American sailor. Born at Chester,



Port Elizabeth. South end viewed from the lighthouse. Top, public library and S. Mary's Church. Centre, Market Square and Main Street looking north

Pennsylvania, June 8, 1813, he first served under his father, Admiral David Porter, in the Mexican navy, but in 1829 entered the U.S. service, in which he became lieutenant in 1841. At the outbreak of the Civil War he was sent to relieve Pensacola, and earned rapid promotion. By a daring and well-executed action he opened the Mississippi for Farragut to capture New Orleans, 1862. In command of the Mississippi squadron, he took part in the operations at Arkansas Post and Vicksburg, and in 1863 was promoted rear-admiral, receiving the thanks of Congress for his services. The following year he commanded the N. Atlantic blockading squadron, concluding his war services with the capture of Port Fisher, Jan. 15, 1865. In 1870, after the death of Farragut, he was promoted to the rank of admiral. He died at Washington, Feb. 13, 1891.



David D. Porter, American sailor

Porter, ENDYMION (1587-1649). English royalist. Member of a Gloucestershire family with Spanish connexions, he was brought up in Spain.



Endymion Porter,
English royalist

After returning to England he became groom of the bedchamber to Charles, prince of Wales. In 1622 he was sent to Spain on a diplomatic mission, accompanied Prince Charles there in the following year, and in 1628, and again about ten years later, was entrusted with other missions to the Spanish court. A loyal servant of King Charles, he voted against Strafford's attainder, and was expelled from Parliament. He left England in 1645, and lived in France and the Netherlands until 1649, when he returned to London, where he died, being buried in St. Martin-in-the-Fields, Aug. 20, 1649. He had acquired a considerable fortune, and was well known as a patron of art and letters; Herrick and other writers addressed poems to him. *See* Life and Letters, D. Townshend, 1897.

Porter, FITZ JOHN (1822-1901). American soldier. Born at Portsmouth, New Hampshire, Aug. 31, 1822, and educated at the Military Academy of West Point, to which he returned as an instructor after distinguished service in the Mexican War, he rose during the Civil War to the rank of brevet brigadier-general. He was uniformly successful until after the second battle of Bull Run, when he was accused of having contributed to the disaster by disobeying Pope's orders, and was dismissed. Reinstated in 1886, he died May 21, 1901.



Fitz John Porter,
American soldier

Porter, GENE STRATTON (1868-1924). American author. Born in Indiana, she became the wife of Charles Darwin Porter in 1886. She was a keen naturalist and student of bird life, and became known as an able photographer of animal and bird life. She



Gene Stratton Porter,
American author

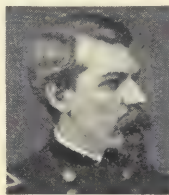
has written several works on natural history, but is best known by her novels, most of which deal with out-of-door life in a fresh and cheerful tone, which has given them wide circulation. They include *The Song of the Cardinal*, 1902; *Freckles*, 1904; *A Girl of the Limberlost*, 1909; *Laddie*, 1913; *Michael O'Halloran*, 1915; *Morning Face*, 1916; *A Daughter of the Land*, 1918. She died Dec. 7, 1924.

Porter, HORACE (1837-1921). American soldier and diplomat. Born at Huntingdon, Pennsyl-



Port Erin, Isle of Man. Town and bay from the south, looking towards Bradda Head
Frith

vania, April 15, 1837, he entered the U.S. army as 2nd lieutenant, 1861, becoming lieutenant-colonel and aide-de-camp to General Grant, 1864, and brevet major-general, 1865. He rendered distinguished services in the Civil War, notably at Chickamauga, Wilderness, and Newmarket Heights, became assistant secretary for war, 1866, and was executive secretary to President Grant, 1869-73. He acted as U.S. ambassador in Paris from 1897-1905, receiving the Grand Cross of the Legion of Honour, 1904, and died on May 29, 1921. He published his reminiscences of the Civil War, *Campaigning with Grant*, 1897.



Horace Porter,
American soldier

Porter, JANE (1776-1850). British novelist. Born in Durham and brought up in Edinburgh, she achieved great success in 1803 with her first novel, *Thaddeus of Warsaw*, a story of Polish exile. This was followed, in 1810, by *The Scottish Chiefs*, the hero of which is the Scottish patriot, William Wallace. Despite its artificiality the book won immense popularity, and at home, on



Jane Porter
After G. Harlowe

the Continent, and in America to this day has retained its hold upon the affections of a certain circle of readers. Among her other works are, *The Pastor's Fireside*, 1815, and *Sir Edward Seaward's Narrative of his Shipwrecks and consequent discovery of certain islands in the Caribbean Sea*, 1831. She died at Bristol, May 24, 1850.

Port Erin. Watering-place of the Isle of Man. It stands on the S.W. coast, 15 m. by rly. from Douglas at the head of a landlocked inlet, Port Erin Bay. There

is a harbour, but the breakwater is now a ruin. The place has golf links and good bathing, while the beautiful scenery around is another attraction. Here are a fish hatchery and a marine biological station. Pop. 3,200.

Port Essington. Harbour of Northern Territory, Australia. On Coburg peninsula, it was founded as a penal settlement in 1831, but was abandoned in 1850 as unhealthy.

Port Fairy. Town and harbour of Victoria, Australia, 187 m. by rail W.S.W. of Melbourne. It is a centre of a trade in wool and grain. Pop. 2,000.

Port Florence. Port of Kenya Colony, E. Africa, otherwise known as Kisumu (*q.v.*).

Portfolio (Lat. *portare*, to carry; *folium*, leaf). Case for carrying papers. It is practically a large book cover with a flexible back, and fastened with a spring or ribbons, in which drawings, prints, music, or other loose papers can be carried without folding. The word is also applied to the office of a minister of state, presumably because the minister is responsible for all the documents appertaining to his department. Minister without portfolio is a term used to describe a Cabinet minister who has no departmental duties. Such were not uncommon in France and other countries, and during the Great War they were appointed in the United Kingdom. The outcry against the appointment of Dr. C. Addison to a position of this kind led to a promise that the practice should cease, as it did on his resignation, which took place in 1921.

Port Glasgow. Mun. bor. and seaport of Renfrewshire, Scotland. It stands on the left bank of the Clyde, 20 m.



from Glasgow, with a station on the Cal. Rly. The chief buildings are the town hall, town house and library, all modern.

Port Glasgow arms Birkmyre Park is a public recreation ground, and near are the ruins of Newark Castle. The industries are chiefly connected with shipbuilding, and the burgh has wet and dry docks, shipbuilding yards, iron-foundries, and works for making rope, sailcloth, etc. Timber is largely imported. Port Glasgow arose from the village of Newark. In 1668 the baillies of Glasgow bought the land from the Maxwells and built a harbour, making it the seaport of Glasgow, hence its name. In 1710 it was made the chief custom house port for the Clyde, and in 1775 was created a burgh. During the 19th century Glasgow gradually absorbed the trade of the Clyde owing to the deepening of the river, which permitted liners to reach the Broomielaw at Glasgow; at Port Glasgow, however, shipbuilding developed into a great industry, and a trade with Canada and the West Indies was maintained. Pop. 21,000.

Port Harcourt. Seaport of Nigeria. It stands at Iguacha, on one of the largest creeks entering the Bonny and New Calabar rivers, about 30 m. from the mouth of them, in Nigeria. A precipitous cliff rises to a height of 45 ft., and there is a depth of 50 ft. alongside, conditions unknown elsewhere in this part of Africa. It is the terminus of the rly. being constructed N. to join the Iddo-Kano Rly. It was named after Viscount Harcourt when, as Lewis Harcourt, he was colonial secretary.

Portcawl. Seaport and urban dist. of Glamorganshire, Wales. It is 30 m. from Cardiff, with a station on the G.W. Rly. There is a dock, but the export of coal and iron is less than formerly. The chief building is the church of St. John the Baptist. The town is visited for bathing and golf. The urban district includes Newton. Pop. 3,500.

Port Herald. Town of the Nyasaland Protectorate, S. Africa. Situated on the Shire river, it is 214 m. by water from Chinde, at the mouth of the Zambezi, and 61 m. by rly. from Chindio, the terminus of the rly. from Blantyre to the Zambezi.



Port Glasgow. Town and harbour looking across the Clyde to Ben Lomond

Valentine

Port Hope. Port and town of Ontario, Canada, in Durham co. Situated on Lake Ontario, 63 m. from Toronto, and served by the C.N.R., G.T.R., and C.P.R., it has a good harbour, and is a watering-place, as well as a market for the produce, mainly fruit, of the neighbourhood. Pop. 5,100.

Porthos. Character in Dumas's romances, *The Three Musketeers*, *Twenty Years After*, and *Le Vicomte de Bragelonne*. He is one of the famous trio of musketeers; a vain, titanic hero who dies magnificently at bay in the third of the romances. See Aramis; Athos.

Port Huron. City and port of entry of Michigan, U.S.A., the co. seat of St. Clair co. A popular summer resort, it stands at the mouth of St. Clair river, in Lake Huron, 61 m. N.E. of Detroit, and is served by the Grand Trunk and Père Marquette Rlys., and by lake and river steamers. An important shipping trade is carried on, and among its manufacturing establishments are boiler and engine works, rly. workshops, machinery and motor vehicles, and agricultural implement factories. The village of Port Huron was laid out in 1849, and became a city in 1857. Pop. 25,900.

Portia. Character in Shakespeare's play *The Merchant of Venice*. A wealthy heiress, won by Bassanio, she learns that Antonio stands in danger of forfeiting his life by his inability to repay money he has borrowed from Shylock, the Jew, to equip her lover for his wooing. Thereupon she disguises herself as a counsellor and by her pleading secures the acquittal of Antonio and the discomfiture of Shylock. See *Merchant of Venice*.

Portici. Town of Italy, in the prov. of Naples. It stands on the Bay of Naples at the W. base of Mt. Vesuvius, 5 m. by rly. S.E. of Naples. In 1631 it was destroyed by an eruption of Vesuvius. It has an 18th century palace and a museum of antiquities. Fishing, silk-worm rearing, and the manufacture of silk are the most important industries. Adjoining the town is Resina (*q.v.*), which stands over the ruins of Herculaneum. Pop. 14,500.

Portion. In English law, that which a parent gives to a child in order to set him up in life; or, in other words, his share of the parental inheritance. Equity leans against double portions, and therefore if a parent has, by his



Portia, character in Shakespeare's comedy, *The Merchant of Venice*. From the painting by H. Harris Browne

will, left a share of his estate to a child, and, after making his will, but before his death, has given the child the same amount or something equivalent, a court of equity will presume that he meant the gift to be in satisfaction of the legacy; and the child will not be allowed to have both, to the impoverishment of other children.

Portioner. In Scots law, a female heir at law, corresponding to a coparcener in English law. All portioners inherit equally the



inheritable estate of a common ancestor dying without male issue. In ecclesiastical usage the term portioner is applied to a minister who serves a benefice jointly with others, and receives only a portion of the tithes or benefits of the living, and also to the portion commonly allotted to a vicar out of a rectory or impropriation.

Portishead. Urban dist. and watering-place of Somerset, England. It stands on the estuary of the Severn, 11 m. from Bristol, with a station on the G.W. Rly. There is a dock here covering 12 acres, belonging to the port of Bristol. S. Peter's is an old church, and near the town are traces of an ancient camp. Pop. 3,300.

Port Jackson. Spacious harbour of New South Wales, Australia. The so-called Parramatta river is really the largest arm of the harbour. Sydney was founded on one of its coves, and has since spread along both the N. and S. shores, which are connected by numerous ferries. See Sydney.

Port Jervis. City of New York, U.S.A., in Orange co. It stands at the junction of the rivers Navesink and Delaware, 87 m. by rly. N.W. of New York City, and is served by the Erie and the New York, Ontario and Western Rlys. It is a popular summer resort, and has a Federal building and a public library, and various industrial establishments, including rly. repair shops, iron-foundries, and silk, glove, stove, and glass factories. Port Jervis was incorporated in 1853 and became a city in 1907. Pop. 10,200.



Portland. Peninsula of Dorsetshire, England, known as the Isle of Portland. Connected with the mainland by Chesil Bank, it is $4\frac{1}{2}$ m. long, with an average breadth of one

the 16th century, and still used officially, and remains of a much older one.

Pennsylvania Castle was built about 1800 by a member of the Penn family. Portland has a harbour of refuge used by the navy. Known as Portland Roads, it covers 2,200 acres, and is protected by gigantic breakwaters built by con-



Portland, Dorsetshire. 1. The castle, built by Henry VIII. 2. Main entrance to the prison. 3. Portland Harbour from the mainland, showing the torpedo factory

mile. A rly. line runs down the peninsula from Melcombe Regis, and it can also be reached by



Portishead, Somerset. Parish church of S. Peter

steamer from Weymouth. The line passes by Easton, Rodwell, and Portland.

Portland is noted for its building stone, the quarries being crown

vict labour. The largest of them cost over £1,000,000. The harbour is strongly fortified. The inhabitants, who live by fishing and pasturing sheep, retain some of their old customs. As the Isle of Slingers, Portland is the scene of T. Hardy's story, *The Well-Beloved*. It forms an urban district. Pop. 17,000.

Portland. Three towns in Australia. One is in New South Wales, in Roxburgh co., 12 m. N.W. of Lithgow on the rly. to Mudgee. Pop. 2,400. The second is in Victoria, in Normanby co., on the coast on the W. side of Portland Bay; it is an agricultural centre and rly. terminus 200 m. W.S.W. of Melbourne. Pop. 2,400. The third is in S. Australia, in Adelaide co. Pop. 1,100.

Portland. City of Maine, U.S.A., the co. seat of Cumberland co. The largest and chief commercial city of the state, it stands on Casco Bay, 106 m. N.N.E. of Boston, and is served by the Grand Trunk and other rlys., and by coasting steamers. Among its chief buildings are the city hall,

the Federal building, the co. court house, the observatory, the Masonic building, and the Sweat memorial art building. The capacious harbour, across which is a fine bridge connecting the city with South Portland, is defended by several forts. The public parks system covers an area of more than 100 acres.

Quantities of grain, livestock, etc., are exported, and among its manufacturing establishments are lumber mills, machinery and marine engine works, and boot and shoe, hat, furniture, paint, stove, and boiler factories. The city has ship-building yards, large grain warehouses, and is a fishing centre.

The first settlement here was made in 1633, the place being first known by its Indian name of Machigonne. Its early inhabitants were troubled by Indian attacks,

a zoological garden and about 350 acres of public parks.

Portland has an extensive harbour, accessible by the largest vessels, and carries on an important export trade in flour, grain, and lumber. Its industrial establishments include lumber and flour mills, foundries and machine shops, iron-works, and furniture, saddlery, soap, candle, and paint factories. There are also canning and meat-packing houses.

Portland was founded in 1845, and as its founders came from Maine they called it after Portland there. In 1873 it was damaged by fire, but it soon recovered. It had been made a city in 1851, and in 1891 East Portland and Albinia were added to it. In 1905 a great exhibition was held here, in honour of the visit of two explorers, Meri-

the English ships were watching for him. Off Portland he attacked some of them under Blake and Deane, and the battle continued all day, the rest of the English ships coming up one by one to the fight. Neither side secured any advantage, but, owing to lack of ammunition, Tromp was unable to renew the fight on the following morning. He therefore made haste home and the battle resolved itself into a pursuit by the English. In this, although many of his ships left him, Tromp showed great skill in keeping the pursuers at a distance. The Dutch, however, lost heavily in both warships and merchantmen during the retreat.

Portland, EARL AND DUKE OF. English titles, the former held by the family of Weston and both by that of Bentinck. Sir Jerome



Portland, Maine. The town and harbour, showing in centre distance the two great grain elevators of the Grand Trunk Rly. Across the harbour lies South Portland

and in 1690, in conjunction with the French, these foes destroyed the settlement. In 1718, after peace had been made with France, settlers again made their homes here, calling the place Falmouth. The townsfolk took the side of the colonists in the struggle for independence, for which a British fleet damaged their town in 1775. In 1786 the name Portland was given to part of Falmouth and the present municipality arose. It was the capital of Maine from 1820-32. Longfellow was born here and the city has several mementoes of the Longfellow and Wadsworth families, some of them housed in the poet's early home. In 1866 damage estimated at £2,000,000 was done by a fire that broke out during the celebration of July 4. Pop. 69,300.

Portland. Largest city of Oregon, U.S.A., the co. seat of Multnomah co. It stands at the confluence of the Columbia and Willamette rivers, 53 m. N. by E. of Salem, and is served by the Great Northern and other rlys., and by ocean-going and coasting steamers. The buildings include the city hall, court house, art museum, and public library. The Episcopal cathedral is one of many churches. Here is the medical department of the state university. The city has

wether Lewis and William Clark, to this district a century before. At the head of a small party, they were the first white men to cross the continent from south to north. Pop. 258,000.

Portland, BATTLE OF. Fought between the English and the Dutch, Feb. 18-20, 1653. Tromp was sailing home along the Channel, convoying a merchant fleet, and

Weston, an Essex landowner, had a son Richard, who entered Parliament and was sent abroad on business by Charles I. In 1628, being in high favour with the king, he was made lord high treasurer and created Baron Weston. In 1633 he was advanced to the rank of earl of Portland, and he held the office of treasurer until his death, March 13, 1635. His three successors



Portland, Oregon. General view of the town from the mountain side

were all loyal to the Stuarts, and the title became extinct when, in 1688, the 4th earl died abroad.

The earldom was revived in 1689 by William III for his Dutch favourite, William Bentinck, and his son Henry



6th Duke of Portland,
British nobleman
Russell

was made duke of Portland in 1716. The 3rd duke was prime minister of England, and the 5th was the eccentric recluse who was wrongly asserted to have lived a double life, masquerading also as T. C. Druce, a tradesman in Baker Street, London. On his death, in 1879, his nephew became the 6th duke. The duke's eldest son is called the marquess of Titchfield. The chief residence of the family is Welbeck Abbey, in Nottinghamshire, where the dual estates mainly are. The valuable London property around Welbeck Street, Portland Place, Baker Street and neighbourhood owned by the 5th duke was left by him to his sisters, one of whom was Lady Howard de Walden. The Portland Town estate, London, was sold by Lord Howard de Walden for £500,000 in 1920.

Portland, HANS WILLIAM BENTINCK, EARL OF (1649-1709). English politician. He was born of a noble Dutch family, July 20, 1649, and came to England first as a confidant to William, prince of Orange. On his master's accession to the crown, Bentinck was created earl of



Earl of Portland,
English politician
After Simon de Bois

Portland, and sworn of the privy council, April 9, 1689. Henceforth he was William's confidential adviser, and conducted several

diplomatic missions with skill. In command of a regiment of Dutch horse, he rendered distinguished service at the battle of the Boyne, July 1, 1690, and received the order of the Garter seven years later for work on the treaty of Ryswick. He was married thrice and had a numerous family. His death took place Nov. 23, 1709.

Portland, WILLIAM HENRY CAVENDISH-BENTINCK, 3RD DUKE OF (1738-1809). British statesman. The eldest son of William, second duke of Portland, he was born April 14, 1738. He entered parliament in 1761, succeeded to the



3rd Duke of Portland,
British statesman
After Stothard

dukedom the next year, and in 1765 became a member of Lord Rockingham's cabinet. In 1766 he married the daughter of the duke of Devonshire, whose surname of Cavendish he assumed by royal licence in 1801. During the ministry of Lord North, Portland was in opposition, but held office again, April, 1782, when he was appointed lord lieutenant of Ireland. In April, 1783, he became prime minister in a coalition government, resigning in the following December. He was made home secretary 1794-1801, and again became premier in 1807, resigning office in Oct., 1809. He died Oct. 30, 1809.

Portland Beds. In geology, name given to a sub-division of the Upper Jurassic system of rocks. The strata of the Portland Beds lie above the Kimmeridge Clay and below the Purbeck Beds, and are typical in the S. of England, particularly at Portland, Dorset. Portland Beds consist chiefly of limestones, contain many fossil shells, and are extensively used for building stones. See Kimmeridgian.

Portland Bill. Cape of the English Channel. It forms the bold and rocky extremity of the Isle of



Portland Bill, Dorsetshire. The rocky cliffs on the west side of the cape
Frith

Portland, Dorset. Between it and the Shambles Sandbank is a dangerous stretch of water, the race of Portland. Near by is a lighthouse, with a light visible for 18 m.

Portland Cement. An intimate mixture of calcareous (limestone, marl, chalk, alkali waste) and

argillaceous (clayey limestone, clay, shale, slag) materials, burnt at a clinking temperature, the resultant clinker being ground to a fine powder (cement) and packed in barrels or in bags. A British Standard Specification for Portland cement was published in 1904 and revised in 1907, 1910, and 1915. See Building; Cement; Concrete; consult also The Portland Cement Industry, W. A. Brown, 1916.

Portland Channel OR CANAL. Fjord on the Pacific Coast of N. America. It stretches almost due N. for 100 m., and separates the S. end of the Alaskan mainland from British Columbia.

Portland Club. London social club. Named after the duke of Portland, it was founded in 1816. The house is at 9, S. James's Square. The Portland is generally recognized as the chief English card-playing club.

Portland Vase. Fine example of cameo-glass of the early Roman empire. An amphora, 9½ ins. high,



Portland Vase. The Roman cameo-glass vase now in the British Museum

its blue glass body has an opaque white overlay cut in relief, illustrating the Peleus and Thetis story. Formerly in the Barberini palace, Rome, it passed into the Portland family, who deposited it in 1810 in the British Museum. Shattered by a madman in 1845, it was skilfully restored. Josiah Wedgwood made 50 earthenware reproductions.

Port Louis OR ISLE OF FRANCE. Seaport of Mauritius, capital of the island. It stands on the N.W. coast, and both town and harbour are strongly fortified, the latter being difficult to enter. There are Anglican and R.C. cathedrals, botanical gardens, and two observatories, astronomical and meteorological.



Port Louis, Mauritius. The Roman Catholic cathedral of S. Louis

logical. Exports include sugar, aloe fibre, coconut oil, etc. Many of the traders are Indians and Chinese. Pop., with suburbs, 50,100.

Port Macquarie. Inlet on the coast of New South Wales, at the mouth of the Hastings river. The township of the same name is a seaside resort, 174 m. from Sydney by sea, and exports cobalt. Pop. 1,100.

Portmadoc. Market town and seaport of Carnarvonshire, Wales. It stands on Tremadoc Bay, 16 m. from Carnarvon, with a station on the Cambrian Rly. It has a commodious harbour, and exports slates, which come by a narrow-gauge rly. from Blaenau Festiniog. Portmadoc stands upon land reclaimed by a man named Madocks, hence its name. Market day, Fri. Pop. 4,400.

Port Mahon. Spanish naval station and seaport. It is the capital of Minorca, Balearic Isles, and is the ancient Portus Magonis. At the head of an inlet on the E. coast, its harbour is one of the best in the Mediterranean, and is fortified. It was occupied by the British, 1708-56 and 1762-82, and was ceded to

viscount (1829-1919) was succeeded by his eldest son, Henry Berkeley Portman (1860-1923).

Portman Square. London square. At the S.W. end of Baker street, Marylebone, W., it is named after William Henry Portman (d. 1796), owner of a large estate in Marylebone. Begun about 1764 and completed about 1784, it has

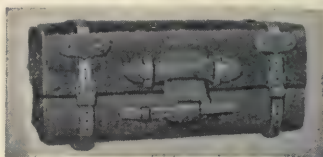
county, was made Baron Portman in 1837, and raised to the rank of viscount in 1873. His descendants still bear the title. The viscount owns much valuable property in London, including Portman and Bryanston Squares. Bryanston is the name of his Dorset seat. The second



Port Moresby, Papua. View of Fairfax Harbour and part of the native pile village of Elavora

always been a fashionable quarter. Earl Nelson, elder brother of the sailor, lived here, and Lord Nelson himself is said to have resided at No. 9. Mrs. Montagu held her salons at Montagu House (*q.v.*),

Portmanteau (Fr. *porter*, to carry; *manteau*, a cloak). Case or receptacle of leather, canvas, cane,

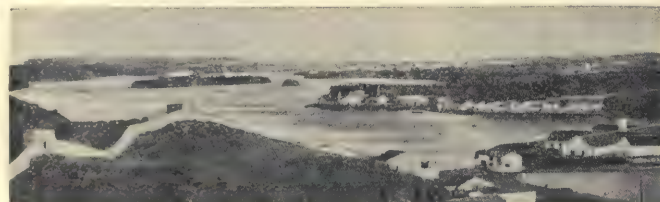


Portmanteau made of leather

etc., usually consisting of two compartments opening on hinges at the back, and secured when closed by straps and locks.

Port Melbourne. Seaside suburb of Melbourne, Australia. Situated at the head of Hobson Bay, the N. portion of Port Phillip, it has numerous docks and wharves. It was formerly known as Sand Ridge. Pop. 14,000.

Port Moresby. Capital and chief port of Papua. It is centrally situated on the sheltered and picturesque Fairfax Harbour, has



Port Mahon, Minorca. The harbour and fortifications

Spain in 1802. The church of Santa Maria has a remarkably fine organ; there are but few traces of the ancient walls; most of the buildings are of stone. It has an arsenal and a wireless telegraphy station. Pop. 17,500.

Portman, Viscount. British title held since 1873 by the family of Portman. Edward Berkeley Portman- (1799-1888), a Dorset landowner, and an M.P. for that

at its N.W. angle. At No. 32 Caroline of Brunswick stayed with Lady Anne Hamilton, author of *The Secret History of the Court of England*. No. 15, once No. 12, was occupied by the 10th duke of Hamilton, and became the town residence of the Princess Louise, Princess Royal, who married the 1st duke of Fife. See *History of the Squares of London*, E. B. Chancellor, 1907.

regular steamship communication with Sydney, and has a wireless station. Copper is mined close by. It dates from 1873. Pop. 3,000.

Port Natal. Harbour of Natal, Union of S. Africa. On it developed the chief port of the colony, Durban, and it is sometimes used as a synonym for that city, although strictly it is only its harbour.

Port Nolloth. Port of Namaqualand, S. Africa. It is on the N.W. coast of the Cape Province, and is chiefly interested in the shipping of copper, being the terminus of the rly. line that runs to the copper mines at O'okiep. There are churches, clubs, library, etc., and the place is visited by pleasure seekers. A promenade has been made, and there is some fishing. The climate is dry with an average annual rainfall of less than 3 ins.; water is brought in tanks by the rly. from 5 m. inland. Sea fogs are frequent and necessitate the use of fog signals from the light-house. There is regular steamer communication with Cape Town. Pop. 1,600.

Porto. Dist. of Portugal, in the prov. of Entre Minho-e-Douro. Named from its chief town, Oporto, it is hilly in the E., level by the coast, and is well served by rlys. Area, 893 sq. m. Pop. 680,000.

Porto Alegre. City of Brazil, capital of the state of Rio Grande do Sul. Situated at the convergence of the Jacuhy and other navigable rivers, near the N. end of Lagoa dos Patos, 160 m. N.N.E. of Rio Grande, its harbour is commodious and provided with docks. It has a cathedral, technical schools, and government buildings, manufactures woollens, footwear, glass, etc., and exports cattle, salted beef and pork, hides, tobacco, Paraguayan maté, beans, and cereals. It is the terminus of several lines of rlys. to the interior. An active river trade is carried on by steamers with the agricultural



Porto Bello, Panama. Ruins of the old fortress

Porto Bello. Seaport of Panama, on the N. side of the isthmus. It stands on the Caribbean Sea, 24 m. N.E. of Colón. Once commercially important, its prosperity has declined. It was taken by the British under Admiral Vernon in 1739, when the fortifications were demolished. Pop. 1,500.

Porto Empedocle (formerly Molo di Girgenti). Seaport of Sicily, in the prov. of Girgenti. It stands on the S. coast, 5 m. by rly. S.W. of Girgenti, for which it is the port. Here are large warehouses of the Girgenti

sulphur and corn merchants, who export great quantities of these commodities. Pop. 11,000.

Porto Ferrajo OR PORTO FERRAIO. Town of Italy, in the prov. of Leghorn. It is the capital of the island of Elba, and is on the S. slopes of a citadel-crowned hill on the N. coast of the island. Here are two residences used by Napoleon when in exile. W. of the town is a large foundry. The lighthouse on the hill is a well-known landmark. There are good sea-bathing establishments. Pop. 5,000. See Elba, illus.

Port of Spain. Seaport of Trinidad, British W. Indies, and capital of the island. Situated on the E. coast, facing the Gulf of Paria, its harbour is a port of call for many lines of steamers, and a wireless telegraphy station. A finely built town, with wide streets, it has Protestant and R.C. churches, botanical gardens, in which is the governor's residence, a royal college, etc. Commercially it has supplanted St. Thomas, and exports, cocoa, sugar, asphalt, coconuts, copra, rum, and petroleum, besides re-shipping produce from Vene-

zuela. It is also known as Spanish Town. Pop. 60,000.

Porto Grande OR MINDELLO. Seaport of St. Vincent, Cape Verde Islands. A coaling station, and the commercial centre of the archipelago, it stands on the N.W. coast of the island, and has an excellent harbour.

Portogruaro. Town of N. Italy, in the prov. of Venice. It stands on the small river Lemene, 1½ m. above the site of the ancient Roman military station of Concordia. It is a rly. junction 42 m. from Venice and is the seat of a bishop. Pop. 3,100.

Porto Maggiore. Town of N. Italy, in the prov. of Ferrara. It is close to the W. shore of the lagoon, Valle del Mezzano, at the N.W. corner of the Adriatic Sea, and is 15 m. S.E. of Ferrara and a rly. junction on the route between Ferrara and Ravenna. Pop. (commune) 20,000.

Porto Maurizio. Frontier and maritime prov. of N.W. Italy, in Liguria. Bounded W. by France, N. by Cuneo, E. by Genoa, and S. by the Ligurian Sea, it is wholly mountainous and contains the chief towns of the Italian Riviera. It is traversed by the new rly. from Cuneo to Ventimiglia, and by the coast line from Nice to Genoa. Noted particularly for its splendid olives, it produces and exports oil, wine, fruit, and flowers. Its area is 456 sq. m. Pop. 149,600.

Porto Maurizio. City of Italy, capital of the prov. of Porto Maurizio. It is a seaport and health resort on the Italian Riviera,



Porto Alegre, Brazil. The harbour and business district of the city

colonies in the N. part of the state. Pop. 100,000.

Porto Amelia. Settlement on the shores of Pemba Bay, Portuguese East Africa, about 120 m. N. of Mozambique. It is under the administration of the Nyasa Company, and has been since 1907 the capital of the district instead of Ibo. The town was laid out by the Spilsbury expedition in 1900. In 1915-16 Pemba Bay formed the base for the operations of the Portuguese against the Germans in German East Africa. Pop. 500.

Portobello. Watering-place of Midlothian, Scotland, part of the city of Edinburgh. It stands on the Firth of Forth, 3 m. from Edinburgh proper, with a station on the N.B. Rly. It is a popular seaside resort, and has some manufactures. Portobello was a separate burgh, with its own provost and council, until 1896, when it was included in Edinburgh. The name is supposed to have been taken from a cottage built here in 1742 by a sailor who had taken part in the capture of Porto Bello in 1739. See Edinburgh.



Port of Spain, Trinidad. Protestant church of Holy Trinity, built in 1818



Porto Maurizio, Italy. Promontory with the old town and the harbour, from the road to Oneglia

70 m. by rly. S.W. of Genoa. Picturesquely placed on a promontory, the old part of the town is on a hill, while modern villas, hotels, etc., line the shore. Surrounded by olive groves, it exports an excellent oil. It has a fine domed church (1799). Included in the commune is Oneglia, 2 m. N.E. Both towns are frequented for their sea-bathing. Pop. (commune) 8,000.

Porto Novo. Harbour of Madras Presidency, India, on the Coromandel coast, in S. Arcot dist. It is at the mouth of the small Vellar river on the Madras-Tuticorin main rly. The settlement was originally made by the Portuguese in the latter part of the 16th century. Here Sir Eyre Coote defeated Haidar Ali in 1781. Pop. 15,800.

Porto Novo. Seaport and capital of Dahomé, French W. Africa. The residence of the lieutenant-governor, it is situated at the E. end of a lagoon which is in communication with the other coastal lagoons. A narrow-gauge rly. goes, 50 m., to Pobé. Pop. 25,000, 180 being Europeans.

Porto Praia OR VILLA DA PRAIA. Portuguese port, capital of the island of Santiago, Cape Verde Islands. Situated on the S. coast of the island, with a good harbour, it contains a palace of the governor-general, an observatory,

museum, and a cable station. In the bay, Porto da Praia, an English fleet defeated a French one on April 16, 1781. Pop. 21,000.

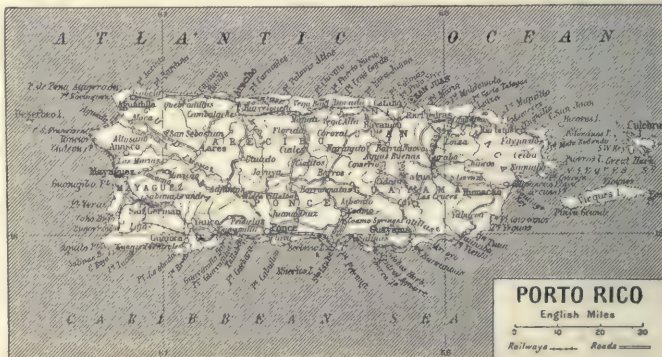
Porto Rico. Island in the W. Indies, a possession of the U.S.A. The easternmost and smallest of the Greater Antilles, it lies 75 m. E. of Haiti, and measures 100 m. by 38 m. It is crossed from

E. to W. by mountain ranges, on either side of which rich alluvial lands stretch down to the sea. The rivers, which flow generally N. and



Porto Rico arms

undeveloped. Rly. transport facilities are almost confined to the coastal rlys., which nearly encircle the island. The capital is San Juan; other large towns being Ponce and Mayaguez. Discovered by Columbus in 1493, the island was settled by Juan Ponce de León in 1510. It remained a Spanish possession down to 1898, when it was ceded to the U.S.A. by the treaty of Paris, Dec. 10, 1898. Two years later civil government was established. An earthquake, Oct., 1918, killed over 100 persons, rendered thousands homeless, and caused damage esti-



Porto Rico. Map of the island in the West Indies, ceded to the U.S.A. in 1898

S. from the centre of the island, are numerous, among the principal being the Loiza, Arecibo, Plata, and Bayamon.

The elevated parts of the island are covered with fine forests of palms, sandal-wood, cedar, willow, and various fruit trees. The very fertile soil produces sugar, coffee, cotton, bananas, and tobacco, and cattle-rearing is an important industry. Exports of fruit are increasing rapidly. Gold and other minerals exist, but are little exploited, and manufactures are

mated at £800,000. Area, 3,606 sq. m. Pop. 1,118,000, about two-thirds being whites.

Portpatrick. Seaport and watering-place of Wigtownshire, Scotland. It is 7 m. from Stranraer on the Portpatrick and Wigtownshire Rly., and is 21 m. from the coast of Ireland. About 1600 it was made a station for the packet service to Ireland, but this ceased in 1849. In 1821-43 large harbour works were constructed at a cost of £500,000, but these were allowed to fall into ruin, as the expected trade did not develop. It has a little trade, and is visited as a seaside resort. Pop. 1,100.

Port Phillip. Harbour of Victoria, Australia. The largest indentation on the Victorian coast, it is 30 m. from N. to S., and 30 m. across at its widest part. Melbourne and its suburbs are on the N., and Geelong on the W. Discovered in 1802, and used for three months as a penal settlement in 1803, it was first colonised in 1835, and gave its name to Port Phillip dist., which in 1851 became Victoria. See Melbourne.



Portpatrick, Wigtownshire. Town and harbour from the west

Port Pirie. Seaport in S. Australia. It stands on Spencer Gulf, 154 m. by rly. N. of Adelaide. It has smelting works for Broken Hill mines, one of the largest silver-lead works in the world. It exports ore and wheat. Pop. 9,400.

Portraiture. Generally, the representation of objects or persons by drawing. The term is usually applied to the art of drawing or painting likenesses of persons. *See* Art; Miniature; Painting.

Portree. Seaport of Inverness-shire, Scotland. It stands on Portree Bay, on the W. side of the Isle of Skye, 120 m. from Oban. The capital of Skye, it is the chief business centre of that island, and is also visited by tourists. It has a harbour, and has steamer communication with the mainland. The name is said to be derived from *Port à roi*, given to it because James V once landed here. Pop. 2,400.

Portreeve (Lat. *porta*, gate). English municipal officer. Until the 11th century the chief civil officer of a mercantile town was called the portreeve. The title was gradually replaced by that of mayor. *See* Sheriff.

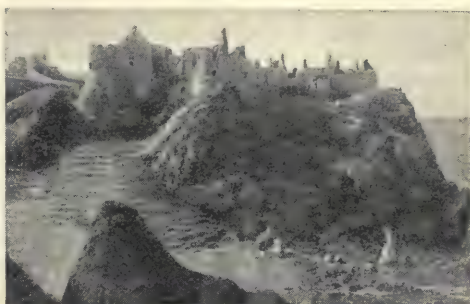
Port-Royal. Name of a famous Cistercian convent in France and of a school of theological thought to which it gave rise. Founded in 1204 by Mathilde de Garlande, the convent stood between Versailles and Chevreuse, in the valley of the Yvette. Early in the 17th century it underwent a great revival under Jacqueline Marie Angélique Arnauld and members of her family, who had the sympathetic support of S. Francis de Sales, Blaise Pascal, and others, and, removing to Paris in 1626, in 1633 began a new life in the Faubourg St. Jacques, Paris. The convent there was known as Port-Royal de Paris.

A male community of recluses being formed, the old building, Port-Royal des Champs, was restored for their accommodation, and became a centre of Jansenism, educational activity, in which the Paris house joined, and anti-Jesuit propaganda. In the intervals of their devotional exercises, the recluses of Port-Royal devoted themselves to literary pursuits, and agricultural and mechanical labours. The system of teaching the young the elements of learning, and at the same time imbuing their minds with a sense of piety, was inspired by the Abbé de St. Cyran, one of the most notable of Jansen's colleagues. Among other distinguished students was Racine. The teaching, a modified form of Cartesianism, aimed more at moral than at intellectual results, but special attention was paid to the

study of the French language. In addition to Greek, Latin, and Italian grammars, the works issued included the influential *Art du Penser*, or *Logique de Port-Royal*, 1659, in which Antoine Arnauld and Pierre Nicole were chief collaborators.

Political jealousy of its success and ecclesiastical opposition to the teaching of Port-Royal attracted many powerful enemies, and though Pascal and Anne of Bourbon, duchesse de Longueville, succeeded in saving it for a time, the recluses were eventually forced to vacate Port-Royal des Champs for Les Granges, a farm near by. St. Cyran was accused of heresy, and at the instance of Cardinal Richelieu was imprisoned at Vincennes, where he lingered for five years, and survived his release only by a few months.

Finally, the remaining members of Port-Royal having been expelled without mercy in 1709, the buildings were destroyed, by order of Louis XIV, Jan. 22, 1710. St. Cyran and his associates were accused of plotting the ruin of the Roman Catholic Church; all that could be proved against them in this connexion was that while they held the pope infallible in matters of faith, they thought he might be deceived as to fact. *See* Arnauld; Jansenism; Pascal; consult also *Mémoires pour servir à l'histoire de Port-Royal*, A. Arnauld, ed. B. de la Bruyère, 1742; *Port-Royal*, C. Beard, 2 vols., 1861; *Port-Royal*, C. A. Sainte-Beuve, 6th ed. 1901; *The Story of Port-Royal*, E. Romanes, 1907; *The Nuns of Port-Royal*, M. E. Lowndes, 1909; *Little Schools of Port-Royal*, H. C. Barnard, 1913.



Portrush, Ireland. Ruins of Dunluce Castle, formerly a stronghold of the earls of Antrim

Port Royal. Seaport and naval station of Jamaica, British W. Indies. Situated at the end of a long, sandy tongue of land enclosing the harbour, 4 m. direct S.W. of the capital, it is strongly fortified, and has a royal naval dockyard, arsenal, barracks, military hospital, etc., and is the headquarters of the British naval forces in the West Indies. The town was destroyed by an earthquake in 1692, by fire ten years later, and by a hurricane in 1722.

Portrush. Urban dist., seaport, and watering-place of co. Antrim, Ireland. It stands on Ramore



Portrush arms

Head, 67 m. from Belfast, with a station on the Midland (Northern Counties of Ireland) Rly. An electric line connects it with the Giant's Causeway, 7 m. away, and near also are the ruins of Dunluce Castle. The buildings include a town hall. Portrush has a harbour, and from here steamers go regularly to Liverpool and Glasgow. For visitors there are golf links and good bathing. Pop. 2,100.

Port Said. Town in Egypt, at the N. entrance of the Suez Canal. It stands on land reclaimed from the sea, and was founded in 1859, when

the first surveys for the canal were made. Here are the offices of the Suez Canal Co., and various mercantile and steamship offices. Port Said, named after Said Pasha, the promoter of the canal, is a coaling station and a shipping centre. Pop. 54,000. *See* Suez Canal. *Pron.* Sigh-id.



Port Said, Egypt. Lighthouse near the entrance to the Suez Canal; the light is visible for 20 miles

Portsea. Peninsula of Hampshire, England, known as the island of Portsea. It lies between Portsmouth and Langstone Harbours, and is about 6 m. from N. to S. On it stands Portsmouth, and part of that borough is known as Portsea. See Portsmouth.

Portslade. Urban dist. and watering-place of Sussex, England. It is 4 m. W. of Brighton, on the E. side of Shoreham Harbour, with a station on the L.B. & S.C. Rly. The chief building is the church of S. Nicholas. Pop. 6,500.

Portsmouth. County, municipal borough, naval station, and seaport of Hampshire, England. It stands on a peninsula jutting into the English Channel, between Portsmouth and Langstone Harbours, and is 74



Portsmouth arms m. from London, with stations on the L. & S.W. and L.B. & S.C. rlys. The borough consists of five parts, Portsmouth proper, Portsea, Landport, Southsea, and Cosham. Portsmouth and Portsea facing the harbour are the naval districts; Landport to the N.E. is a working-class area; Southsea to the E. and S.E. is a watering-place, and Cosham to the N., mainly an agricultural region. In 1921 Portsmouth supplanted Woolwich as the chief ordnance depot. Arrangements were, in 1921, being made to create a new diocese of Portsmouth.

Apart from the naval establishments, the chief buildings are the town hall, a fine modern pile, the church of S. Thomas Becket, a cruciform edifice dating from the 12th century but largely restored in modern times, the fine parish

church at Portsea built by W. H. Smith, the garrison church, originally part of a hospital and restored to preserve its Early English character, and the Roman Catholic cathedral. There is a grammar school. Other buildings of interest include the Star and Garter, with its memories of Nelson and other seamen, the museum housed in the old guildhall, and the Dickens museum. There are theatres, picture palaces, and a concert hall. At Southsea is a fine esplanade on which are several memorials, and here also is an extensive common. Victoria Park is one of several open spaces. The port does a considerable trade, and steamers go regularly from here to Ryde and Southampton. A ferry and a floating bridge connect it with Gosport. The town has a service of electric tramways.



Portsmouth, New Hampshire, U.S.A. Old houses and wharves on the water front

As the chief naval station of Great Britain, Portsmouth has a royal dockyard covering an area of over 300 acres and having 10 m. of rlys. Connected with it are Admiralty House, barracks, hospitals, a naval college, museum, and a torpedo range. It has accommodation for building and repairing the largest warships, and usually employs about 15,000 men. It is entered from Portsea Hard. N. of the dockyard is Whale Island, where is the naval gunnery school. Southsea Castle, now a fort, was built in the 16th century.

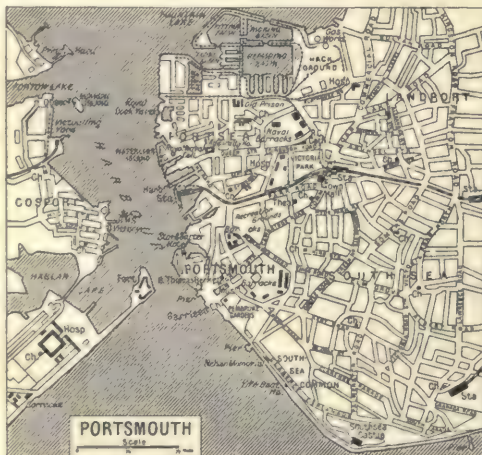
Portsmouth dates from the 12th century, when it became a borough with markets, fairs, and a mer-

chant guild. It soon became a port with a considerable trade, but its growth as a naval station was due to the decay of Porchester, where the harbour was being closed by the sea. About 1540 a royal dockyard was established here and this was soon extended, although its great expansion did not come until the 19th century. The borough returned two members to Parliament from 1895-1918, when the number was increased to three. It was made a county borough in 1888. Dickens, Besant, and Meredith were born here. In Oct., 1921, a war memorial was unveiled, consisting of a cenotaph, with statues of a sailor and a soldier in fighting kit. Pop. (1921) 247,343.

Portsmouth Harbour is an opening of the English Channel. The entrance is a narrow stretch of water between Portsmouth proper and Gosport, after which it opens out. Porchester is on the N. side of the harbour, which is about 4 m. from N. to S. In it are Whale, Horsea, and Pevit islands. In 1921 a scheme for the development of Langstone Harbour as a mercantile port was being considered by the corporation of Portsmouth.

Portsmouth. City of New Hampshire, U.S.A., a co. seat of Rockingham co.. It stands on the Piscataqua river, 58 m. by rly. N. by E. of Boston, and is served by the Boston and Maine rly. The only seaport in the state, it has a capacious harbour, containing a number of picturesque islands, on one of which there is a U.S. navy yard. Portsmouth has a Federal government building, an atheneum, and a public library. Boots and shoes are manufactured; marble is quarried. Settled in 1623, Portsmouth was incorporated in 1653, and became a city in 1849. Prior to 1807 it was the state capital. The peace treaty between Russia and Japan was concluded here in 1905. Pop. 13,600. See Portsmouth, Treaty of; Russo-Japanese War.

Portsmouth. City of Ohio, U.S.A., the co. seat of Scioto co. It stands at the confluence of the Scioto and Ohio rivers, 114 m. E. by S. of Cincinnati, and is served by the Chesapeake and Ohio and other rlys., and by the Ohio Canal. There are a number of public parks. It is the centre of an important



Portsmouth, Hampshire. Plan of the town with its five districts and the harbour



1. Portsea, seen from the deck of a warship moored to the South Railway Jetty, showing the curved viaduct to Portsmouth Harbour Station. 2. Parish church of S. Thomas & Becket. 3. High Street and the George Hotel, where Nelson spent his last night ashore. 4. Municipal College, in Town Hall Square. 5. The Town Hall. 6. Parade ground of the Royal Naval Barracks

FORTSMOUTH: BUILDINGS AND SCENES IN BRITAIN'S GREAT NAVAL DEPOT

Stephen Cribb, Southsea

mining and agricultural district. Manufactures include boots and shoes, machine-shop products, furniture, building materials, etc. Portsmouth was settled in 1803, incorporated in 1814, and became a city in 1851. Pop. 33,000.

Portsmouth. City of Virginia, U.S.A., the co. seat of Norfolk co. It stands on Elizabeth river, opposite Norfolk, and is served by the Chesapeake and Ohio and other rlys., and two canals. The buildings include Trinity Church, dating from 1762, the city hall, and a naval hospital. Here is one of the largest yards of the U.S. navy. It covers 450 acres and has facilities for building warships and training men. The industrial establishments include cotton mills and smelting works, while the town is a centre of the oyster fishery. Portsmouth dates from 1752, when the British government set up a navy yard. This became the property of the U.S.A. government, and was used by the Confederates during the Civil War. Portsmouth was made a town in 1852 and a city in 1858. Pop. 40,700.

Portsmouth, EARL OF. British title borne since 1743 by the family of Wallop, long settled at Wallop in Hampshire. John Wallop, a lord of the treasury, 1717-20, was made Baron Wallop in 1720, and an earl in 1743. The earldom has since been held by his descendants. Newton Wallop, the 6th earl (1856-1917), held a minor post in the Liberal administration, 1905-8. In 1917 his brother, John Fellowes Wallop, became the 7th earl. The earl's eldest son is known as Viscount Lymington.

Portsmouth, LOUISE DE KÉROUALLE, DUCHESS OF (1649-1734). Mistress of Charles II of Great Britain. She belonged to an old Breton family, and as maid of honour attended Henrietta, duchess of Orléans, when she visited her brother Charles at Dover in 1670. She was later sent as a secret French emissary to London, and before 1672 was recognized as the king's mistress. In July of that year she bore him a son who was created duke of Richmond, and in the following year she was created duchess of Portsmouth. Her insatiable avarice made her extremely unpopular in England, and after Charles's death she returned to France, dying in Paris, Nov. 14, 1734. See Louise de Kéroualle, Duchess of Portsmouth, H. Forneron, Eng. trans. 1887; From Brittany to Whitehall, Mrs. Colquhoun Grant, 1909.

Portsmouth, TREATY OF. Peace that in 1905 ended the war between Russia and Japan. After

the defeat of Russia at Mukden, the president of the U.S.A. in June, 1905, suggested that peace negotiations should be begun. Both accepted the invitation, and on Aug. 10, Kamura and Takahira met de Witte and Rosen at Portsmouth, New Hampshire. The treaty signed on Sept. 5 recognized Japan's dominant position in Korea, while Russia ceded the southern half of Sakhalin and the leased territory of Liaotung. Both parties agreed to evacuate Manchuria, which, except the leased territory, was restored to China. There were a number of other provisions of minor importance. See Russo-Japanese War.

Port Stanley. Seaport and capital of the Falkland Islands (*q.v.*) It stands on Port William Inlet, on the N.E. coast of East Falkland. Whale products, wool, hides, and seal fur are the chief exports. Pop. 950.

Port Sudan. Seaport of Sudan, on the Red Sea. It is the terminus of a rly. from Atbara Junction. The port is the centre of a con-



Louise de Kéroualle, Duchess of Portsmouth

After Sir Peter Lely

siderable traffic with the Sudan in gum, cotton, sesame, senna, and ivory. The harbour is well equipped for handling coal.

Port Sunlight. Industrial model village of Cheshire, England. It lies 3 m. S. by E. of Birkenhead



Port Sunlight, Cheshire. The Diamond, an open space in the centre of the village, looking toward the bandstand

on the L. & N.W.R., and is reached from the river Mersey by a tributary, Bromborough Pool. The estate, laid out in 1888 by Messrs. Lever Bros., Ltd., covers an area of 235 acres, and the attractive cottages, well spread out, are let to workers in the great soap manufactory at favourable rents. There are large recreation grounds, social clubs, welfare institutions, and the Gladstone Hall, opened 1891, and Hulme Hall, 1901, are among the chief public buildings of the village. The works are well served by rly. and by riverside wharves.

Port Swettenham. Seaport on the Strait of Malacca in Selangor. It dates from 1901, when the rubber of the Federated Malay States required a port for export; much earth was dumped on a tidal flat, mangrove covered, at the mouth of the Klang and Langat rivers, a passenger jetty and three wharves were built, the rly. was extended from Klang, and the port was made.

Port Talbot. Seaport of Glamorganshire, Wales. It stands on Swansea Bay, 11 m. from Swansea, with stations on the G.W., Port Talbot, and Rhondda and Swansea Bay Rlys. It has two large docks. Copper smelting is another industry. Port Talbot was founded in the 19th century, on land owned by the Talbot family. In 1921 it was created a borough. It absorbed the existing borough of Aberavon and also included the urban dist. of Margam and some rural areas.

Port Townsend. City of Washington, U.S.A., the co. seat of Jefferson co. It stands on Puget Sound, 40 m. N.N.W. of Seattle, and is served by the Northern Pacific Rly. and by steamers. Its harbour is one of the finest and most commodious in the world. Port Townsend has an important export trade, chiefly in lumber, grain, dairy produce, livestock, and oil, and among its industrial establishments are foundries and machine shops, saw mills, boiler works, and fish canneries. Port Townsend was settled in 1851, incorporated in 1860, and became a city in 1890. Pop. 2,800.

PORTUGAL: THE LAND AND THE PEOPLE

A. D. Innes, K. G. Jayne, and Robert Machray

See the articles on the cities and towns, statesmen, navigators, and men of letters of Portugal: also those on Goa, East Africa, and other Portuguese colonial possessions. See also Europe

Portugal is a republic of S.W. Europe. The ancient Lusitania, it is bounded N. and E. by Spain, and elsewhere by the Atlantic Ocean. It is a maritime country, only one of its provinces, Tras-os-Montes, not touching the sea. Its greatest length, from N. to S., is 358 m., and its greatest breadth 141 m. Its area is 34,254 sq. m., or, with the Azores and Madeira Islands, officially included with continental Portugal, 35,490 sq. m. Pop. 5,545,595 and 5,957,985 respectively.



Portugal. Arms of the Republic

Portugal possesses colonies in Africa and Asia as follows: Cape Verde Islands, Guinea, Principe and St. Thomas Islands, Angola, East Africa or Mozambique, Goa, Diu, Timor, Macao, etc.; total area, 936,264 sq. m.; total pop. 8,736,000.

Physical Features

Physically, Portugal is an integral part of the Iberian Peninsula, its mts. and rivers being mainly prolongations of those of Spain. The longest river rising in Portugal is the Mondego, in Beira. The largest mt. range is the Serra da Estrella, 6,540 ft. In the S. is the Serra d' Ossa, a continuation of the Sierra Morena, and, still farther S., the Serra de Monchique. The chief rivers are the Minho, which forms part of the N. boundary; the Guadiana, which forms part of the S.E. frontier; the Douro, and the Tagus. The coast, some 500 m. in length, is generally low and flat, except near the Tagus and Cape St. Vincent. Apart from the estuaries of rivers, the only deep indentations are the Bay of Setúbal and the Ria de Aveiro or Aveiro lagoon, S. of Oporto. The only islands are the Farilhões and Berlengas. Among the minerals found are sulphur, copper, wolfram, lead, coal, tin, silver, gold, iron, etc. Salt is obtained from the Aveiro lagoon and other salt-marshes.

Portugal's propinquity to the sea tempers the heat felt in Spain, and, apart from some too sheltered valleys and exposed parts of Alemtejo, the climate generally is equable and temperate.

The indigenous flora embraces the usual plants of N. Europe, but imported semi-tropical varieties also flourish, and include the

agave, eucalyptus, maple, Portugal cypress, magnolia, Barbary oak, carob-tree, myrtle, palm, aloe, and tree-fern. There are large forests of oak and cork trees, and the botanical forest garden of Busaco is one of the richest in Europe. The fauna of Portugal resembles generally that of Spain. In the Estrella Mts. wolves are found.

The people are of mixed race. Originally of Iberian stock, they were influenced racially by Carthaginians, Romans, Celts, Jews, Arabs, and negroes. In the N. the Galician Spanish type prevails, in the centre the Arabic, and in the S. the negroid. All, however, were largely influenced by the Visigothic invasion, and but little by the Spaniards. The Moorish invasion, both physically and intellectually, was the most powerful factor in determining the type. Inter-

marriage was so general that there arose a class called the Mozarabic, which was Arabic in tongue and manners, Christian in religion, and Portuguese in blood. The conquests in Africa introduced a new type, since the tolerant habits of the people interposed no racial bar against Africans, even negro slaves. To-day, the Portuguese are a kindly, hospitable, artistic, sober, and patriotic people, though somewhat shiftless, and, in the rural districts, rather superstitious. The chief towns are Lisbon, the capital (pop. 1911, 435,000), and Oporto (194,000), the only two which have a population in excess of 50,000. Portugal is divided into six provs., viz. Entre Minho-e-Douro, Tras-os-Montes, Beira, Estremadura, Alemtejo, and Algarve.

Government and Constitution

After the fall of the monarchy a new constitution was adopted Aug. 20, 1911. It provides that there shall be a president and two chambers, viz. the national council, and the second or upper chamber. The former consists of 164 members, elected for three years by direct suffrage; the latter is composed of 71 members, elected by all the municipal councils, and is renewable as to one half of the members every three years. The president of the republic is elected by both chambers, his term of office being for four years; he may not be re-

elected. He appoints the ministers of state, who are responsible to parliament. The constitution may be revised every ten years. There are ten ministries, viz. those of the colonies, held by the premier, the interior, justice, finance, public works, war, marine, education, foreign affairs, and labour. For judicial purposes Portugal is divided into 193 comarcas, each of which has three courts of appeal sitting in Lisbon, Oporto, and Ponta Delgada (Azores), and a supreme court in Lisbon.

A new monetary system, abolishing the antiquated and cumbersome reis currency, was established May 22, 1911. The new unit is the gold escudo (*q.v.*) of 100 centavos.

For local government and administrative purposes the six provinces were in 1833 divided into districts named after their chief towns. These units are administered by a commission consisting of a civil governor, an auditor, and three elected members. The districts are divided into councils or communes called *concelhos* governed by elected councils, including a mayor appointed by the state; these are sub-divided into *freguesias* or parishes, administered by a junta de parochia and the *regedor*, nominated by the governor, to represent the communal mayor.

RELIGION AND EDUCATION. There is no state religion in Portugal; all forms of worship are tolerated, but the bulk of the people are Roman Catholic. Portugal is divided into three ecclesiastical provinces, those of Lisbon, Braga, and Evora, each with its own archbishop. The Azores, Madeira, and the W. African Colonies, with five sees, form part of the province of Lisbon; there are also the provinces of Mozambique and Goa. The archbishop of Lisbon is called the patriarch, and of Braga the primate.

Educational Statistics

Conventual establishments were formally suppressed by law in 1834, their property being confiscated by the state; this law has been enforced by the republic. There are Protestant churches and missions in some of the larger towns, but the number of Protestants is small. Primary education is compulsory, but, though supposed to be enforced by law, it is still far from general. According to the census returns of 1900, only 21 p.c. of the whole population could read. In 1913 there were 5,563 public elementary schools, and 31 secondary schools. There are three universities, at Coimbra, Lisbon, and Oporto. The teaching of divinity is prohibited by the state. There are various private schools, including



Portugal. National flag: green and red

1,750 primary schools, many secondary and ecclesiastical schools and seminaries, industrial, technical, and commercial schools. There are also colleges of art and music, a naval and military school. Each district capital and three other towns have state lyciums.

Army and Navy

The Portuguese army is a militia raised by conscription, and is divided into the active, the reserve, and the territorial army. The peace establishment of the active army is fixed at 30,000 men with some 2,800 officers. The reserve consists nominally of 35 infantry regiments, 8 squadrons of cavalry, and 24 field batteries, with other units. There are also the Republican and the Fiscal Guards, available for active service in war time. The Republican Guards, numbering 5,000 men, are military police, about 800 being mounted. The Fiscal Guard is somewhat larger. All adult males from 17 to 45 are liable to serve ten years in the active army, ten in the reserve, and five in the territorial army. Recruits undergo from 15 to 30 weeks' training, and afterwards a fortnight's annual training.

There are in the active army 35 regiments of three battalions, 11 cavalry regiments of four squadrons, and field artillery regiments, mountain and garrison batteries, engineer units, etc. There are over-sea garrisons in the Azores and Madeira, and a colonial army, in Africa, India, etc. The navy is very small, almost negligible—a few small cruisers, old gunboats, transports, ten torpedo boats, and three submarines. The personnel is about 6,000.

INDUSTRIES. The soil is very fertile, except in the mountainous



Portugal. Map of the Republic

parts, but agriculture is backward, nearly one-half of the land being uncultivated—43 p.c. is waste ground. Forests cover 19 p.c., or over 4,000,000 acres, with pine, oak, cork trees, chestnut, and Pyrenean oak. The vine is the most generally cultivated plant, and wine the most important product. In the mountainous regions rye is grown, and sheep and goats reared; in the N., maize and cattle are raised; in the S., wheat and swine, large herds of pigs fattening in the vast oak forests. Olive trees cover nearly 1,000,000 acres; figs, tomatoes, onions, known as Spanish, potatoes, oranges, nuts, etc., are grown; silkworms and bees are reared.

Oxen are used for agricultural work and transport. Solid wooden wheels for the ox-carts, and ploughs formed of branches, are relics of the Roman occupation, while the irrigation machinery and wells are

reminiscent of the Moors. Fish abound in all rivers and off all coasts; immense quantities of sardines are caught, cured, and tinned for exportation, though not always as Portuguese brands; tunny fish is largely caught, and oysters are exported.

Until comparatively recent times Portugal was not a manufacturing country, the Methuen treaty preventing textile manufactures. Since 1892, when protective duties were imposed, cotton spinning and weaving have been firmly established, the industry now ranking next after fisheries. One distinctive Portuguese industry is the manufacture of porcelain tiles, called azulejos; the name and the industry were originally Moorish. There are large cooperages, necessitated by the wine trade, and articles manufactured of cork are largely exported. Other industries are silk, leather, glass, paper, and gold and silver filigree manufactures. Lace and embroidery are also made.

Robert Machray

HISTORY. Portugal had no distinct political existence in ancient or early medieval times. In the 10th century A.D. the greater part of the Spanish or Iberian peninsula was in the hands of the Moors. In the second half of the 11th century, Ferdinand I and Alfonso VI of Castile drove the Moors to the south, and recovered for Christianity the lands as far as the River Tagus. In 1094 Alfonso bestowed the recently annexed province upon his son-in-law, Henry of Burgundy, as the county of Portugal or Porto Callo. Henry's son, Alfonso I, a great ruler and warrior, fought valiantly with the Moors, extended his dominions, captured Lisbon, and assumed the title of king instead of count in 1140, the year after the famous victory of Ourique, won against the Moors. The status of Portugal as an independent kingdom was recognized by Castile in 1143.

Growth of the Kingdom

The small Portuguese kingdom continued to wage successful war against the infidels, and to prosper under a line of efficient rulers, who, besides fighting vigorously, were not neglectful of the progress of the people. Sancho I was one of the few European monarchs who successfully resisted the claims of domination of the mightiest of the Popes, Innocent III. Portugal was extended to what were practically its permanent limits in the reign of Alfonso III (1248-79), whose predecessor, Alfonso II, had been the first to summon the Cortes, or National Council. Alfonso's successor, Diniz, is regarded as the founder of

Portugal's commercial and industrial activities, but war with the Moors and struggles to resist the dominion of Castile were the chief occupation of his son, Alfonso IV, the Brave. The struggle with Castile was finally decided by the brilliant Portuguese victory at Aljubarrota, Aug. 14, 1385, in the reign of John I (1385-1433). John's marriage to Philippa, daughter of John of Gaunt, the father of Henry IV, king of England, gave rise two centuries later to the claim to the English throne put forward by Philip of Spain, whose mother was a Portuguese princess, through whom he had already claimed the Portuguese crown.

The Maritime Empire

John's long and wise reign laid the foundations of the Portuguese maritime empire, a work of which the prime promoter was his younger son, Prince Henry, called the Navigator, under whose direction expedition after expedition sailed from the shores of Portugal, discovered the Canaries and the Azores, and crept round the great western shoulder of Africa. Other maritime states were absorbed with the traffic in the Mediterranean and the seaboard of Western Europe. The south was left to the Portuguese, who, while John II (1481-95) was engaged, like so many other monarchs of the time, in establishing the supremacy of the crown over the feudal nobility, reached the extreme south of the Dark Continent. In 1488 Bartholomew Diaz first doubled the Cape of Good Hope, and in 1497 Vasco da Gama crossed the Indian Ocean, and reached the shores of India, at Calicut. Three years later the Portuguese sailors discovered Brazil, the eastern shoulder of South America. The famous bull of Pope Alexander VI (1493) bestowed upon the Portuguese all new lands which had been, or might be, discovered E. of a line which was ultimately drawn from N. to S. 270 leagues W. of the Azores, while all territory W. of that line was to go to Spain.

For 80 years Portugal enjoyed a monopoly of the southern and eastern seas. With her tiny population, she could not acquire wide territory, and even her purely maritime empire, despite the wealth it brought her, imposed too heavy a strain on her capacities. In 1580, when the direct male line of the kings came to an end, the crown was claimed, through his mother, by Philip II of Spain, despite the better title of the House of Braganza. Philip had no difficulty in enforcing his claim, though the English tried to win the throne for

an illegitimate pretender, Don Antonio. In effect, Portugal was annexed by Spain. In the 17th century, however, the Spanish monarchy was striving to suppress all provincial rights and liberties, and the Portuguese, roused to revolt in



Portugal. Map showing distribution of natural wealth and the principal industries of the people

1640, proclaimed John of Braganza king. The rivalry between France and Spain ensured for the new claimant the support of France, though it was not till the struggle had lasted 28 years that the House of Braganza was decisively established on the independent throne of Portugal by the treaty of Lisbon. The recognition of the dynasty by the marriage of Charles II to Catherine of Braganza, in 1661, established what was a permanent, if not a formal, alliance between Portugal and Great Britain.

Peninsular War

But Portugal, once the queen of the seas, was now no more than an insignificant European state, though she still held possession of her American colonies, of the Brazils, and of trading settlements in the Indian Ocean. Externally, her political significance lay mainly in the fact that she provided an open gateway for the British into the Spanish Peninsula. Portugal was the base of the British peninsular campaigns in the War of the Spanish Succession (1701-1713) and the Peninsular War (1808-1814).

In 1807 Napoleon resolved to sweep Portugal into the net of his continental system directed against the commerce of England; but King John, faithful to the friendship with Great Britain, chose exile in preference to submission, and withdrew to Brazil, where he established the headquarters of the Portuguese government. Napoleon's attempt to seize Portugal, and Spain also, brought about the British intervention and the Peninsular War. After the fall of Napoleon, King John remained in Brazil, leaving the Portuguese administration in the hands of the British. But in 1820 John returned to Portugal, assigning Brazil as a separate empire to his son, Pedro IV. Pedro, on his accession to the Portuguese throne in 1826, resigned it, while retaining the Brazilian empire, in favour of his daughter Maria da Gloria.

A prolonged struggle followed between the reactionaries, headed by Pedro's brother Miguel, who claimed the crown, and the constitutionalists, with the young queen as their figure-head, in which the victory of the latter was not secured until 1834, chiefly through the protection extended against foreign intervention, first by Canning and then by Palmerston. Portugal felt the general political unrest which was disturbing Europe; the party contests between the advanced democrats, known as the Septembrists, and the moderate constitutionalists, called Chartists, as supporters of the charter of 1826, were frequently acute.

Fall of the Monarchy

The crown in Portugal enjoyed prerogatives which gave it a controlling power, while the popular assembly became increasingly democratic. King Carlos, who came to the throne in 1889, was a monarch of liberal views, who was frequently forced by circumstances to adopt a repressive course of action, while the administration generally, captured by a corrupt type of politician, was the real cause of the misgovernment for which he was blamed. While discontent ran high, the king and the crown prince were assassinated at Lisbon, Feb. 1, 1908. The young prince Manoel was raised to the throne, but he was driven from the country by a revolution in Oct., 1910. Portugal was proclaimed a republic Oct. 5, 1910.

A. D. Innes

A provisional government was formed with Theophila Braga as acting president, and he was replaced on Aug. 24, 1911, by Dr. Arriaga, who held office as full president till May 29, 1915. The

policy of the republic separated the church from the state, and decreed the abolition of the religious orders; this played into the hands of the monarchists, and led to armed royalist incursions in 1911, 1912, and 1913, the last being the most serious, but all were defeated.

Revolution of 1915

In May, 1915, a sanguinary revolution, which demonstrated that Portugal as a whole wished to make war on the Central Powers, broke out, but it was not till March, 1916, that war was declared, Bernardino Machado being then in power. Machado succeeded in forming a coalition of all the republican parties, which was known as the Union Sagrada. Enemy ships in Portuguese ports were seized, and the German colony was expelled, and in spite of a revolutionary movement in Dec., 1916,

she had two divisions in France. April, 1917, saw the break up of the Union Sagrada, and the latter part of that year was marked by many strikes and much unrest. In Dec. a military revolution took place under the leadership of Sidonio Paes, which, after four days' bloodshed, was successful, and Paes became provisional presi-

dent; he was elected in April, 1918, but did not hold office long, for he was shot in the following Dec.

Out of 65,000 officers and men sent to France, 1,860 were killed, and about 12,000 were wounded or missing. Some 35,000 European Portuguese troops and upwards of 100,000 native askaris took part in the war in Angola and in the

fighting for German E. Africa. The Peace Conference on Sept. 3, 1919, allotted to Portugal the territory S. of the Kovuma, formerly German E. Africa.

On the death of Paes, Canto e Castro was provisional president, and in Jan., 1919, a strong revolutionary effort under Couceiro, the noted royalist,

was brought to naught. In Aug. Antonio Almeida was elected president, and in March, 1921, Machado was premier. On Oct. 19 a group of republicans in the army engineered a revolution which was accompanied by bloodshed, the premier Granjo and two colleagues being assassinated. Manoel Teixeira Gomes was elected president, Aug. 6, 1923.

Robert Machray

LANGUAGE. Portuguese belongs to the Hispanic group of the Romance languages. Its alphabet is the same as the English alphabet, apart from the letters *k* and *w*, which are only used in words borrowed from other languages. There are thus 24 letters—18 consonants and 5 vowels, with *y*, almost invariably a semi-vowel in Portuguese. Every vowel has two or more distinct sounds, and there are numerous combinations of vowels, such as *ei*, *ao*, *ão*, *oão*, *oes*, *ões*.

Like Spanish, Portuguese is a direct descendant of the rustic Latin dialects spoken by the legionaries who conquered and held the Iberian Peninsula, and in some respects it is nearer to classical Latin than any other of the literary languages of Europe. The Moorish occupation enriched its vocabulary with many Arabic words, but a more important influence was that of the French knights from Burgundy and Provence. By the 16th century Portuguese had become one of the great literary languages of Europe, and the changes it has since undergone are relatively slight. Modern Portuguese is thus far nearer to the speech of Camoens than is modern English to the language of Shakespeare and the Bible.



Portugal. Scenes and types of the peasantry. 1. Farmer of Ramalde. 2. A Caroca farmer in his straw coat. 3. Fisherman of the Aveiro river. 4. Woman from Castro Laboreiro. 5. A girl from Carvalhos. 6. Peasant girl at her spinning-wheel. 7. Women washing clothes on the banks of the Minho

LITERATURE. For over 1,000 years the written language was Latin. A native literature came into existence only after the establishment of the Burgundian dynasty. The French Crusaders brought with them the poems, romances, and chronicles of their own country, thus giving a new literary form to the folk-lyrics and folk-tales which have always been indigenous among the Portuguese peasantry. Spanish models were also closely imitated, and Castilian was long the fashionable language.

Court patronage helped the growth of this new literature, especially during the reign of King Diniz or Denis (1279-1325), himself a poet of some merit, and throughout the whole of the 13th century. The best prose writers of this period were two court chroniclers, Fernão Lopes and G. E. de Azurara. Romances of chivalry were popular. Two of the best, the anonymous *Amadis of Gaul* and *Moraes's Palmer of England*, were of Portuguese origin.

Poets of the Renaissance

Considered as a whole, Portuguese literature is chiefly remarkable for the excellence of its pastoral and lyrical poetry, its histories, and its books of travel. The Renaissance, followed by the discoveries of Prince Henry the Navigator and his successors, afforded new inspiration, and the 16th century is the golden age of Portuguese literature. To this period belongs the *Lusiads* of Camoens, one of the great epics of all time.

Other great figures of this epoch are the dramatist Gil Vicente, whose work bridges the chasm between the mysteries and moralities of the medieval stage and the true comedy of the 16th century; the poets Bernardin Ribeiro, Sà de Miranda, and Antonio Ferreira, and the chroniclers João de Barros, Diogo do Couto, F. L. de Castanheda, and Jaspas Correia. F. Mendes Pinto deserves mention as the author of a fascinating book of travel and adventure, long considered fabulous, but shown by modern investigators to be largely authentic.

During the 17th and 18th centuries, the ecclesiastical censorship and the decadence of Portugal itself tended to give literature a more artificial character. Originality was replaced by an exaggerated classicism. Historians wrote to order and academies flourished. Nevertheless, two great prose writers, Antonio de Vieira and Marianna de Alcoforado, belong to the earlier part of this period, and one distinguished poet, Bocage, to its closing years. Vieira was the prince of Catholic orators in the

17th century. The tragic letters of Marianna de Alcoforado have been published in English as *The Love-letters of a Portuguese Nun*.

From the Peninsular War to the present day, the more conspicuous literary names in Portugal have been those of poets, journalists,



Portuguese Man of War, showing the air-filled float which enables the jelly-fish to sail before the wind

historians, or novelists. The historian Herculano and the dramatist Almeida-Garrett were largely instrumental in securing the triumph of the Romantic movement among their countrymen; and Herculano was also a pioneer of modern historical research. His *History of Portugal* is famous. J. P. Oliveira Martins, a more recent worker in the same field, has been compared with Macaulay; often inaccurate in matter of detail, he wrote brilliantly, and never failed to make the past live. Among the novelists, the best known and most successful have been C. Castello Branco, Eça de Queiroz, and Gomes Coelho. But the best representatives of the modern Portuguese spirit have been the lyrical poets—João de Deus, whose verse has the poignant quality of Heine's songs; Guerra Junqueiro, one of the inspirers of the revolutionary movement of 1910, and others.

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Portuguesa. State of W. central Venezuela. It is situated N. of Zamora, and is named after the river Portuguesa, which traverses the state. Pop. 114,000. The capital is Guanare. The river rises in the Cordillera of Merida, flows S.E. for about 200 m., and unites with the Apure at San Fernando.

Portuguese Man of War. Popular name for the genus *Physalia* of the Siphonophora, a group of jelly-fish. In this group the animals occur in stocks or colonies, vitally attached to one another, but not adherent to rocks. Certain members are provided with locomotive organs, which they use to draw the rest of the stock after them through the water. In *Physalia* the individual members are attached to a large float filled with air, which is supposed to bear some resemblance to an ancient man of war.

The colony is found floating on the surface of the water in the S. seas. The dependent polyps may be divided into three classes. Some are provided with mouths and act as feeders to the colony; others are reproductive; and the rest are provided with stings capable of paralysing their prey and inflicting serious injury on any person who handles them. See *Jelly Fish*, colour plate.

Portulacaceae OR PURSLANE FAMILY. Natural order of herbs and a few small shrubs of world-wide distribution, but chiefly American. They have undivided leaves, two sepals, four or more petals and stamens corresponding in number.

Port-Vendres. Town of France. In the dept. of Pyrénées-Orientales, it contains one of the most commodious harbours of the Mediterranean, defended by forts and batteries. To the S.E. is the lighthouse of Cap Béar. There is a trade in wine. The Roman name was *Portus Veneris*. Pop. 3,000.

Port Way. Traditional name for a Roman road, incorporating an older British track, from Silchester, N. Hants, to Old Sarum, E. Wilts. Traceable through Finkley to the S. of Quarley Hill, it reaches there its greatest deviation, one m., from a straight line, 36 m. long, between the terminal towns. Another road, also called the Port Way, runs from Swindon to Wallingford.

Port Wine. Red, rich, strong wine grown near the mouth of the Douro, Portugal, and named from Oporto, whence it is exported. The wine-growing region, Alto Douro, lies mainly on the S. bank of the river, 60 m. E. of Oporto. Though cold in winter, the climate is very hot in summer, and the wine is naturally strong. The grapes, carefully gathered, are foot-pressed, usually repeated at a secondary stage in order to extract the full colour from the skins.

Before fermentation is complete, about five parts of alcohol are added to 100 of wine; after the first racking, more spirit, generally

brandy, is put in the wine, and this is again repeated before shipping. Port wine thus contains from 17 to 25 p.c. of alcohol, the average amount varying from 18 to 21 p.c. Some natural, specially good, vintage port is shipped unsophisticated, soon after making, but the bulk is manufactured as described, and almost always blended.

Port is stored for a long time, being matured both in cask and in bottle. Some is kept in cask up to 20 years; always it is so kept for two years, and generally for three, or even six, before bottling. The former is a mistaken policy, as the valuable esters escape through the wood, but long rest in bottle improves the wine. Nevertheless, port should not be kept too long, as it loses its essential qualities as well as its red colour, owing to the escape of the esters. The last most famous vintage year was 1847, though wine 100 years old is still on sale, but after 40 or 50 years port becomes of a sherry colour, and though often a delectable drink, it is not characteristically port wine. Port contains from 7 to 15 p.c. of sugar, and a fair amount of tannin, much of which



last is deposited as a crust in the bottle. Some white port is made, chiefly for the Russian and German markets. See Wine.

Port-wine Mark. Mark present on the skin at birth, due to dilatation of the blood-vessels of the skin. See Naevus.



Poseidon. Greek god of the sea. From a statue of the 4th century B.C. National Museum, Athens

Poseidon. In Greek mythology, son of Cronos and Rhea, and god of the sea, that domain falling to him when the universe was divided among him and his brothers, Zeus king of heaven and Pluto king of the netherworld. Dissatisfied with this division, Poseidon conspired against Zeus, but was worsted, and as a punishment had to work for a period for Laomedon, king of Troy. He constructed for that king the famous walls of Troy, but when he claimed the reward promised, Laomedon refused to make good his word. Poseidon accordingly sent a sea-monster, which ravaged the country and exacted a tribute of maidens until killed by Hercules (see Hesione).

The palace of Poseidon was supposed to lie at the bottom of the sea. The symbol of his power was a trident, and he was wont to drive over the sea in a chariot with horses having brazen hoofs and golden manes. He had the power of causing not only storms, but also earthquakes. The Isthmian Games were held in his honour. His wife

was Amphitrite (*q.v.*), and the Romans identified him with Neptuneus or Neptune. See Odysseus; Polyphemus.

Posen. Former province of Prussia, now a county of Poland, and known as Poznan. Its area was 11,200 sq. m., and it had a pop. of about 2,000,000. Posen was the capital and it was divided into the districts of Bromberg and Posen. Hohensalze and Gnesen were other towns. For many years included in Poland, part of Posen was taken by Prussia when the former kingdom was divided in 1772. In 1793 the rest was added to Prussia. From 1807-15 Posen was part of the grand duchy of Warsaw, but in 1815 it was returned to Prussia. In 1848 there was a revolt against Prussian rule.

The people of Posen consisted of the native Poles and a number of German settlers. Later in the 19th century there was a movement among the Poles towards the assertion of their nationality, which the Prussian government countered by measures for Germanising the province. This took the form of forbidding Polish and making German compulsory in the schools, and encouraging Germans to settle on the land, much land being bought from the Poles for this purpose. This policy, which aroused much opposition even within Germany, failed, one sign being the strike of 100,000 school children in 1906. Posen was ceded by Germany to Poland by the treaty of Versailles. See Poznan.

Posen or POZNAN. Town of Poland. It is the capital of the county of Poznan, as it was formerly of the prov. of Posen. It stands on the Warthe, 158 m. E. of Berlin. The town is divided into six districts and became an important frontier fortress in 1828. The Dzialynski Palace is a Romanesque structure erected 1905-10. The Rathaus, destroyed by fire in 1536 and rebuilt 1550-55, contains some frescoes of the kings of Poland. The cathedral, a modernised building rebuilt 1775-89, contains some effigies of former bishops. The Golden Chapel, a Byzantine structure erected at the instigation of Count Raczynsky in 1842, contains two bronze statues of Mieszko I and Boleslaus I by Rauch. In the cemetery of S. Martin there is a monument to the poet Mickiewicz. Machinery, furniture, agricultural implements, leather, tobacco, and cigars are manufac-



Posen, Poland, arms



Posen, Poland. Dzialynski Palace, formerly a Prussian royal residence; top, left, Town Hall, rebuilt, 1550-55

tured, and a trade is carried on in spirits, wood, and grain.

Posen is an ancient Polish town, and was formerly known as Stragon. It became a bishopric in 968, and was the seat of the early Polish rulers. In 1703 it was taken by the Swedes and recaptured by the Poles in 1716. It was ravaged by fire in 1764 and 1803, was entered by the French in 1806, when the peace between France and Saxony was concluded, and in 1815 was ceded to Prussia. The ramparts W. of the Warthe were dismantled 1907-8. In Dec., 1918, it was taken by the Poles after heavy fighting.

Posilipo. Tufa hill, cape, and village of Italy, in the prov. of Naples, immediately W. of Naples and forming a part of that city. The hill is pierced by four tunnels



Posilipo, Italy. Palazzo di Donn' Anna, the ruined 17th century palace of Anna Carafa, duchess of Medina

—two ancient and two modern. The earlier ancient tunnel, the Grotto of Posilipo, was pierced in the reign of Augustus; the later, the Grotto of Sejanus, was excavated in A.D. 37 during the reign of Tiberius. In the vineyards near its entrance is a Roman columbarium, the alleged tomb of Virgil. The Grotta Nuova, constructed 1882-85, affords passage to a tramway, and has a lift ascending to the top of the hill, which is covered with villas and vineyards.

Position. Musical term with several connotations. (1) In string instruments, the shifting of the left hand on the neck in order to attain the higher notes. Theoretically, the violin has eleven positions, though seven mostly suffice. The hand is said to be in the first position when at the extreme end of the neck. The index finger would then be pressed down to obtain the note next above the open string (A on the G string), and the remaining fingers in due order.

In the 2nd position the same finger would obtain B, the hand being shifted a little higher, and so on for the other positions, a note higher each time. The same procedure applies to all the strings.

Many notes can thus be produced in various ways, the choice of position depending partly upon necessity or convenience, and partly upon artistic reasons of phrasing, etc. (2) The term is similarly applied to the use of the slide in the trombone (*q.v.*). (3) In harmony, a chord is said to be in the 1st position when the root is in the bass. When the 3rd, 5th, or 7th is in the bass, it is in the 2nd, 3rd, and 4th positions respectively.

Positive. In photography, the record of an object on a sensitive paper or plate corresponding, as regards light and shade, with the original. Positives are produced by exposure of sensitive photographic material to light through a negative. A positive lens brings

rays of light to a point (focus), or renders a convergent beam of rays more convergent. One positive lens used in conjunction with another thus shortens the focal length. See Negative; Photography.

Positive Organ. Medieval musical instrument. Though small, it was too

heavy to be carried about like the Portative organ (*q.v.*), and therefore had to be "placed in position" before it could be played. Originally a chamber organ, it was incorporated in the larger instrument, being played from the lowest keyboard, and known in England as the Choir organ. Thomas Casson applied the name to a one-manual instrument, in which, by means of various devices, he obtained pedal, melodic, and second manual effects. See Organ.

Positivism (Lat. *positivus*, laid down). System of philosophy. Although it had its forerunners in Protagoras and Hume, the term is specially applied to the system of Auguste Comte. Positivism only recognizes facts or laws established by strictly scientific methods and unaffected by metaphysical or theological considerations. Facts are the phenomena manifested to us by the senses, beyond which nothing exists; laws are the relations of certain facts to other facts. Philosophy investigates the relations of the general laws of each particular science; the object of its search is not the absolute, the causes and principles of things;

its only concern is the relative. Regarded as a religious system, Positivism is the worship of humanity regarded as a whole and single being. Comte's leading idea was that all intellectual training should have a synthetic character, and serve to cultivate the whole character; and in 1851 he published a list of books of permanent value for habitual reading. This list included about 270 distinct compositions by about 140 authors, and was designed to counteract the exclusive spirit of nationality. This list is described and annotated in Frederic Harrison's *Among My Books*, 1912. The best known English positivists are Frederic Harrison, R. Congreve, and E. S. Beesly. See Comte; Harrison, Frederic; consult also Positivism, R. Newman, 1894; What Positivism Means, H. Ellis, 1894; Positivism, F. Harrison, 1902.

Posse Comitatus. Latin phrase meaning the power of the county. In early times the sheriffs in the English counties had the power to call out all suitable males, if needed, to quell disorder or pursue felons, and this was the posse comitatus. The establishment of an efficient police in the 19th century rendered this procedure unnecessary, but the power is still retained by the sheriffs by an Act of 1887.

Possession. In law, having a thing in one's power, or in one's hands. One may possess land, for instance, without occupying it; by having it in the occupation of a tenant. Naked possession, or occupancy, without colour of title or right, is only good to the extent that anyone who seeks to oust the occupier must show that he has a better right. Occupation for 12 years of land, and for 6 years of a chattel, ousts the title of the true owner. Sometimes possession is spoken of as distinct from remainder or reversion. Thus, in the case of a grant of land to A for life, and afterwards to B for life, and afterwards to C and his heirs, A has an estate in possession, while B and C have estates in remainder. When A dies, B's estate comes into possession; and when B dies, C's estate becomes a fee simple in possession.

Possession. Name given to the belief, which has always prevailed in Oriental countries, that evil spirits have the power of entering into and taking possession of the life of any individual. The effect produced by this possession is twofold: (1) physical maladies, especially madness and epilepsy; (2) moral evil, vice, and crime. The belief was very prevalent in

the first century of the Christian era, and the New Testament records many miraculous cures of "men possessed by demons."

There has been much discussion in recent times as to whether the belief in demoniac possession is a superstition—the survival of "animism" which is a characteristic of every form of primitive religion—or whether it represents an objective reality. In view of the light which has been thrown by modern psychology on "dual personality" and "the divided self," the problem cannot be summarily dismissed. R. L. Stevenson's story of Dr. Jekyll and Mr. Hyde rests on the basis of psychological fact. If it can be proved that it is possible for one personality to dominate and control another, the possibility of spirit-possession must be conceded, provided that the existence of evil spirits can be proved. See Demonology; consult also Demon Possession and Allied Themes, J. L. Nevins, 1895.

Posset (origin doubtful, perhaps from Fr. *pusoid*, posset; cf. Welsh *posel*, curdled milk). Beverage made of milk curdled with white wine, ale, lime-juice, or vinegar, and sweetened. It is drunk usually at bed-time as a cure for coughs or colds. The milk is brought to boiling point, and the acidulous liquor added. As treacle is used it is often called treacle-posset.

Possets, PIC DES. Lofty peak of the central Pyrenees, in the prov. of Huesca, Spain. Its height is 11,046 ft.

Possibility. In English law, an estate in possibility is one which is to come into possession upon the happening of an event which may or may not happen, e.g. a gift of land to A if he survives X. An estate limited by way of a possibility upon a possibility is bad in law, as being too remote and uncertain. Thus, gift of a remainder to A's son John, when he has no son of that name, is bad *ab initio*. For, first, there is only a possibility of his having a son, and a further possibility that he shall have a son named John. So that even if he should afterwards have a son, and call him John, the latter would take nothing.

Post, DIE, OR THE POST. German newspaper. Founded in 1866, and published in Berlin every day in the week, it was for some time before the Great War inspired by the German foreign office. A champion of the party calling them selves Free Conservatives, with von Zedlitz as a regular contributor, it vigorously upheld the views of the war lords.

Postage Stamp. Small paper label, of various face values, sold by the post office to be affixed to letters or parcels sent by post, in proof that the cost of conveyance has been paid. Adhesive postage stamps were invented by J. Chalmers, of Dundee, in 1834, and came into official use in the U.K. in 1841, in succession to the Mulready envelope. The earliest types were printed in solid sheets and had to be cut out for use, the perforations being introduced later. Postage stamps vary infinitely in design, colour, and watermark. As a rule they bear the effigy of the ruling sovereign or some symbolic emblem. Special designs are often of elaborate stamp, some of the best printing being done in France, while surcharges of all kinds are also used for particular reasons—e.g. for local use, or when a territory changes hands. See Mulready, W.; Post Office; Stamp Collecting.

Postal District. Area circumscribed in connexion with the postal service, especially of large cities, to facilitate transmission of letters and parcels. The system of numbered districts has been successfully employed in Berlin, Paris, and other capitals for many years, but in London the postal districts, until 1917, were denoted by points of the compass. London is now sub-divided into 112 numbered districts under the old divisions, e.g. E.C.1, N.W.3, etc., and if these details are given on the envelope the business of sorting is much simplified. The change was made during the Great War, when many skilled sorters were diverted from their ordinary work.

Postal Order. Money voucher issued by the British Post Office. These orders are for sums between 6d. and 21s., the charge varying from 1d. to 2d. Sums other than those containing even sixpences can be made up to the required amount by adding postage stamps. For safety an order can be crossed, or the name of the person to whom it is sent and that of a particular post office filled in. Otherwise the orders can be cashed at any money order office. They are also issued at many British post offices abroad.

Postal Union, UNIVERSAL. Combination of

countries which for international postal purposes agree from time to time to arrangements for the interchange and carriage of mails. With headquarters at Berne, Switzerland, the union fixes the rates to be charged, and, generally, encourages the quick and easy conveyance of postal matter between its members. With few exceptions every civilized country now belongs to the union, which, as the International Postal Union, came into force July 1, 1875. Arrangements are modified, if necessary, by congresses held every five years in various capitals, the first post-war meeting having taken place in Madrid, Oct., 1920.

Post Card. Piece of pasteboard used for correspondence through the post office (*q.v.*). In the United Kingdom post cards were first issued in 1870, with the object of enabling correspondents to transmit a message or greeting in brief form. They were originally supplied through the post office with a stamp already printed thereon and cost $\frac{1}{2}$ d. When printed unofficially and sold at any stationers for $\frac{1}{2}$ d., they became popular.

The development of the picture post card (*q.v.*) was due to the initial popularity of the $\frac{1}{2}$ d. post card. Plain cards must not exceed $5\frac{1}{2}$ by $3\frac{1}{2}$ ins. maximum size, the minimum being 4 by $2\frac{1}{2}$ ins. Reply post cards are sold at post offices, and are available for transmission to the country of origin, and to that country alone, and bear the words "Post Card, Great Britain and Ireland" and "Reply," price 3d. Post-cards were used on an enormous scale for commercial purposes, the back being occupied by printed matter. In 1918 the postage on private correspondence post cards was raised to 1d. and in 1920 to $1\frac{1}{2}$ d., but was reduced to 1d. by the Budget of 1922.

Postchaise. A light, four-wheeled, closed vehicle for travellers, said to have been introduced



Postchaise of English construction, as used in early 19th century

into England from France in 1664. It was hired for the journey, as also were the relays of horses employed to draw it from one posting-house to another.

Poster (Lat. *postis*, post, something placed or set up). Large printed sheet of paper, usually of a broad, pictorial design, posted up on a wall, hoarding, etc., for advertising or other purposes. Posters in the modern sense of the word were a product of the 19th century, though in France theatrical advertisements took this form two centuries earlier. Monochrome drawings were introduced for French poster work about 1835 and onwards, and the coloured poster by Jules Chéret (*q.v.*) in 1866.

In Great Britain the standard reached has for the most part been less uniformly good, and even in the 20th century much singularly crude and inartistic work was produced. In contrast with these eyesores the work of such competent artists as Aubrey Beardsley, Walter Crane, the "Beggarsstaff Brothers" (James Pryde and William Nicholson), Dudley Hardy, John Hassall, and many others, stands out prominently. Perhaps one of the most popular of the posters ever employed for advertising purposes was Millais' picture, Bubbles. Another very effective use of a well-known painting was the reproduction during the Great War of Whistler's portrait of his mother, in connexion with the campaign for the sale of War Savings certificates. Especially notable from the artistic point of view were the posters produced for the London Underground combine.

The poster artist in his appeal to the public, while not disregarding detail altogether, aims at broad effects of line and colour, and some of the most successful posters have been simple in design. The picture having arrested the eye, the lesson, from the advertiser's standpoint, is carried home by a few well-chosen words in clear type, so that the passer-by realizes at a glance what the poster is intended to convey. Humour never fails to evoke response.

The activities of the Great War produced an enormous number and variety of posters in all the belligerent countries, the U.S.A. being prominent in this respect after they joined the Allies. Recruiting appeals (*see* Fore-shortening), calls for economy, and a hundred other subjects were presented with a directness and emphasis which produced good results. Psychologically, the poster, by its reiterated appeal to the eye and brain, is, at its best, an important



Poster by the Beggarsstaff Brothers, advertising the production of *Don Quixote* at the Lyceum Theatre, London, in 1885. Original size of poster, 8 ft. square

factor in advertising, and recognized as such. From the collector's point of view the large size of the ordinary poster presents difficulties, nevertheless the hobby was popular for some years. *See* Advertising.

Poste Restante. French term, also in general use elsewhere, for the department in a post office where letters can be sent to wait until the persons to whom they are addressed call for them. Originally

instituted for the convenience of persons travelling, the department as a rule is not available for use by residents in the town itself.

Post-impressionism. French term, school of painting, originating in France with Paul Cézanne (*q.v.*). The Post-impressionist strives to record the emotional significance of things, instead of their mere outward appearance, which is the Impressionist's principal aim. (*See* Impressionism.) In practice this involves the substitution of deliberate design for passive naturalism, which in turn means a drastic simplification of natural forms.



Post-impressionism. A View in Martinique, painted by Paul Gauguin and exhibited at the Post-impressionist exhibition in the Grafton Galleries, London, 1910

After Cézanne, the chief exponents of the new school were Paul Gauguin and Vincent Van Gogh. Younger followers of note are Henri Matisse, Maurice Denis, and Picasso. The movement has found disciples in Holland and Belgium, Germany and Sweden, and since the Post-Impressionist Exhibition in London, 1910, several British artists have been experimenting upon the same lines. *See Art: Painting.*

Posting. System of road travel. By it fixed points (posts) were established on the main road, where relays of horses, drivers, etc., were known to be available. The system is of great antiquity, is found in the ancient Roman Empire and in China, and, a government monopoly in many countries, survived in Europe until the development of rly. transport superseded it. *See Postchaise; Post Office.*

Postlude (Lat. *post*, after; *ludere*, to play). Instrumental piece played after a service as a concluding voluntary, and therefore often applied as a specific title to a composition appropriate for that purpose.

Post Mark. An official mark stamped upon the envelopes of letters, post cards, and packages passing through the post. Primarily employed for cancelling the adhesive stamp, it was later used with names

and dates to indicate where and when the package was posted. In the illustration, S.W. 1 indicates the office of dispatch and A the stamping clerk. During the Great War post marks were utilised for various public purposes in Great Britain and elsewhere; for advertising War Loan, for emphasising the necessity of food economy, etc.

Postmaster-General. In the United Kingdom, the member of the government in control of all departments of the post office, and, as such, responsible to Parliament for policy and efficient administration. The office dates from 1710, when a general post office for the whole of the British dominions was set up in London. The postmaster-general is sometimes a member of the Cabinet. *See Post Office.*

Post Mortem (Lat., after death). Term used for the examination or dissection of a body after death, usually with the object of discovering or verifying the cause of death. *See Autopsy; Coroner.*

Post-obit Bond (Lat. *post*, after; *obitus*, death). Bond, or written obligation, to pay a sum of money after the death of a certain person. As a rule, such bonds are given by expectant heirs, to take effect after the death of the person from whom the expectations arise. They were formerly a favourite form of usurer's security, but they are very hazardous, as a court will set such a bond aside if given by an expectant heir, unless the person in whose favour it is drawn can show that he paid a fair price for it, having regard to the risk.

as best they might by common carrier, or by personal servant. In the reign of Edward I, posting-houses were established along certain main roads, at which the king's messenger could hire a change of horses, and in the next reign a similar system was set up for private couriers. In England the first recorded reference to the office of master of the posts dates from 1516, in an entry describing Sir Brian Tuke as Magister nunciatorum, cursorum, sive postarum. His duties, however, were probably restricted to organizing the service of remounts for the king's couriers.

In the reign of Elizabeth a government postal service was set up for letters to the Continent; and in 1603 the accession of a Scottish monarch to the English throne led to improvements in the supply of posts between the capitals of the two countries. Twelve years later the first postmaster-general for foreign parts was nominated in the person of Matthew de Quester.

A State Monopoly

The first inland post for public use was established by royal proclamation in 1635, a service of messengers being set up for conveying letters along eight main routes at a minimum charge of twopence. Shortly afterwards the carrying of letters along these roads by private messengers was forbidden. In 1649 the common council of London set up a local service of its own; but this was promptly suppressed by the Commons as an infringement of the state's monopoly. The posts were farmed to one John Manley in 1653 for £10,000 a year; a mischievous method which happily was short-lived. Thirty years later a private penny post was established in London for the conveyance of letters and small parcels locally; but again the government intervened. The undertaking was forfeited, was resumed as a branch of the official system, and exists to-day as the London postal district service.

A statute of 1710 created a general post office for the three kingdoms and the colonies under control of the postmaster-general.

The speed and safety of the post were greatly improved when post-boys were replaced by mail-coaches. With the dispatch of a coach bearing the royal mails from Bristol on August 2, 1784, the famous mail-coach system was inaugurated. During the half-century that this flourished, the postal service was completely remodelled. The surfaces of the roads were improved, the system



Post Mark

THE POST OFFICE AND ITS WORK

Ernest A. Carr, Author of *How to Enter the Civil Service*

In connexion with this subject see the articles *Air Post; Telegraph; Telephonic.* See also *Civil Service; Money Order; Postage Stamp; Postcard; etc.*

The word post, derived through the Frer.ch from the Latin participle *positus*, placed, or set in station, carries back the mind to the great days of Rome. Before then, Persia had an established imperial system of state couriers (*see Angary*), but the origin of the modern post office is to be found in the system of couriers organized to secure a speedy communication between imperial Rome and its provinces; couriers were stationed at regular stages or posts along the main roads, their duty being, on receipt of dispatches, to convey these with all haste () the next stage on the journey.

In France, the university of Paris had its own postal system as early as the 13th century; but no state service existed until 1464. The organization then created was greatly improved under Henry IV

and Louis XIII. Unfortunately it was farmed to speculators from 1672 until the Revolution. Napoleon re-modelled it on lines which in the main persist to-day. The Italian post office originated in the service of state couriers formed by the Venetian Republic in the early 16th century. Strasbourg had its own messenger service in 1443, and Nuremberg in 1570. The Prussian system dates from the establishment of an official post between Memel and Cleves in 1646, but it was greatly extended by Frederick the Great. The American colonies for long had only rudimentary postal services. A uniform postal rate of three cents was established in 1863, and was reduced to two cents twenty years afterwards.

In England, public dispatches were long sent by special messengers, private letters travelling



1. General Post Office, King Edward Street, London.
2. Sorting letters at the G.P.O. 3. Back view of
sorting trough, from which the packets of letters are
taken. 4. Interior of railway sorting van. 5. Stamp

obliterating machine which prints legible postmarks.
6 and 7. Apparatus which enables an express train to
pick up and deliver mail bags while travelling. 8. Pneu-
matic tubes for dispatch of local messages

POST OFFICE: SCENES IN THE WORKING OF THE BRITISH POSTAL SERVICE

of relays was reorganized, and the guard of the coach became a postal servant responsible for loss of time *en route*. As a result, the average speed of the mail-coach was quickened from six to ten miles an hour, including stoppages. In 1836 the distance from London to York—197 miles—was covered in the scheduled time of 20 hours. But already the end of this era was at hand. The first tentative dispatch of mails by train was made in 1830, between Liverpool and Manchester.

THE PENNY POST. In 1837 a great postal reform was proposed by Mr. (afterwards Sir) Rowland Hill. At that time postage rates were determined by distance; the lowest charge for a letter was 4d., the average rate 7d., and the cost between Edinburgh and London was 1s. 3½d. Hill published a scheme for a uniform penny postage throughout the kingdom, and, despite opposition, this became operative on Jan. 10, 1840. Devised as a mail-coach service, it was rendered a gigantic success by the advent of the railway. Prepayment by means of postage-stamps replaced the old cumbrous system of collecting dues on delivery, and helped to swell the triumph of the penny post. In the first quarter-century of its existence the average number of postal packets received yearly in Great Britain rose from 5 to 42 per person, and the post office was enabled to pay a largely increased revenue to the treasury. On the average at the present time 74 letters are received yearly per head of the population.

Later devices for improving the letter service include postal sorting-carriages on the railway, special trains conveying only mails on certain routes, and the ingenious apparatus by means of which letters are delivered from, and collected by, trains running at express speed. The registration of packages containing valuables dates from 1792. Imperial penny postage was instituted in 1898 and penny postage between the U.K. and the U.S.A. in 1908.

Changes During the Great War

In the Great War the penny post for letters disappeared. In 1918 the postage was increased to 1½d. for 4 ounces, and for postcards to 1d. In 1920 letters (up to 3 oz.) became 2d., and postcards 1½d. In 1924 the rates were 1½d. (2 oz.) and 1d.

Among the secondary functions of the post office as a public servant, the earliest in date is its money order business. In 1792, to lessen the sending of cash through

the post, six postal clerks, with the sanction of the postmaster-general, introduced a system of "money letters," by which a letter of advice, instead of actual money, was transmitted by post. The department assumed control of this system in 1838, and extended it to other countries. The "money letter," renamed the "money order," proved highly popular. But in 1881 the issue of postal orders for fixed amounts diverted a great deal of public patronage to this simpler and cheaper method of making payments through the post office.

The post office savings bank, established in 1861, to encourage industrial thrift, has become a national institution, and holds the savings of small investors to an aggregate of over a hundred millions sterling. The machinery of the savings bank proved invaluable in promoting popular investment in war bonds during the Great War. The parcel post, introduced in 1883 as an inland service, has since been extended to almost every corner of the globe.

Telegraph Service

The transmission of telegrams was at first in the hands of various private companies. In 1868 the postmaster-general was empowered by statute to maintain electric telegraphs. Two years later all the private inland systems were transferred to his control, and he was granted virtually exclusive rights in the dispatch of telegraphic messages within the kingdom. Certain overseas cable systems remain in the hands of business companies. The length of telegraphic lines now owned by the post office is approximately 187,000 miles.

Wireless telegrams now come within the scope of the P.O. The wireless stations on the coasts of the U.K. were acquired by the Government in 1909-10, except those at Poldhu and Clifden, which are worked by the Marconi Co. In 1921 the first station in the imperial wireless chain was opened at Leaford, Oxfordshire.

The history of the post office telephones resembles that of the telegraphs. Bell's instrument, invented in 1876, formed the basis of several systems evolved by rival companies whose interests were ultimately united in the National Telephone Company in 1889. But the company's activities clashed with those of the department, and, after a long fight, the great commercial system was transferred to the post office.

Other modern extensions of post office business are the issue

of licences for local authorities and for the inland revenue board, the sale of national health insurance stamps, the distribution of old age pensions, and, during the Great War, the payment of soldiers' and sailors' allowances and the creation of a field post-office service for the troops. The payment of allowances involved a distribution of about £2,200,000 weekly to some 2,700,000 persons, and the army postal service grew to enormous size, about 12,000,000 letters being handled weekly. (See Army Post Office.)

Profits and Costs

To-day the departmental headquarters are established in a huge block of buildings at St. Martin's-le-Grand in central London, with the money order office hard by in Fore Street, and the savings bank at West Kensington. But the tentacles of this greatest of government offices extend throughout the United Kingdom, and 14,000 lesser post offices are under its control.

In addition to the clerks and other officers common to all government departments there are certain positions peculiar to the post office staff. Women are largely employed as clerks, writing assistants, sorters, learners (for training as counter clerks and telegraphists), and telephone operators. Boy messengers, whose age must be under 14½ on entry, are given permanent employment if their conduct is satisfactory. Some are chosen by competitive examination to be trained as telegraphists and counter clerks; others become postmen.

The net revenue of the post office in 1913-14 was £32,783,000, and the expenditure on wages and salaries was £15,730,000. In 1920-21 the net revenue was £58,178,000, and the expenditure on wages and salaries £45,000,000. On the postal service there was a surplus of £900,000, but a deficit of £4,000,000 on telegraphs and £4,200,000 on telephones. The budget estimate for 1921-22 was £60,000,000, and to meet an expected deficit of £3,500,000 the postmaster-general increased the price of stamps for postcards from 1d. to 1½d., which was expected to produce an extra million, as was also the higher rate for printed papers. A saving of a like amount was expected from the abolition of the Sunday delivery. This deficit was entirely due to the payment of a war bonus to postal servants.

In 1921 a council of business men to assist the P.M.G. was appointed, and a board consisting of the heads of the most important

branches of P.O. work was also constituted.

In most countries the postal services are managed by the state. In Australia, on June 30, 1919, there were 8,334 post and receiving offices, receipts from which, excluding those from telegraphs and telephones, were £2,998,724. Canada also has a very efficient service, the number of post offices on March 31, 1919, being 12,290, and, in addition, there were 3,705 rural mail delivery routes, on which were erected 181,505 boxes. As for the U.S.A., in 1775 Congress undertook the direction of the postal services, and in 1847 stamps were introduced. The revenue for the year ending June 30, 1920, showed an increase of nearly £15,000,000 on the preceding year.

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Postulate (Lat. *postulatum*, something demanded). In scientific language, the demand that the truth of a principle which has not been, or cannot be proved, should be taken for granted; e.g. in geometry, the claim for the admission of the assumption that a straight line can be drawn between any two points, or, two straight lines cannot enclose a space.

Pöstyén. Town in the Slovakia div. of the Czecho-Slovak republic, also known as Piešťany. It was formerly in the kingdom of Hungary. Situated on the river Vág, 30 m. by rly. N. of Galánta, it is a spa with hot sulphur springs. Most of the people are Roman Catholics, three-quarters are Slovaks, the rest Magyars. Pop. 7,400.

Potamogetonaceae. Botanical name for the pond-weed family. In modern botanical systems it is included in the natural order Naiadaceae (*q.v.*).

Potash. Names given to various chemical combinations of potassium (*q.v.*). Potassium salts is used in the same sense. Potash manures are manures originally obtained from plant ashes, but now mostly derived from natural deposits. The chief forms are muriate or chloride of potash, sulphate of potash, and kainit, which is a mixture of sulphate and chlorides of potash with other salts. See Manures; Potassium.

Potash and Perlmutter. Comedy based by Charles Klein and Montague Glass on short

stories by the latter. It was produced at the Queen's Theatre, London, April 14, 1914, where it had a run of 665 performances. Its success was largely due to Robert Leonard and Augustus Yorke, who assumed the characters of Jews, partners in a ladies' clothing business in New York.

Potassium. One of the metallic elements. Its chemical symbol is K (Arabic, *Kali*); atomic weight, 39.03; specific gravity, 0.87; melting point, 62° C (143.6° F.); in colour, silver white with a touch of violet and a brilliant metallic lustre. At normal temperatures it is soft and malleable, easily cut with a knife or moulded into any form. At 0° C. (32° F.) it is brittle and crystalline; while at a red heat it volatilises in a green vapour. Being lighter than water it will float on its surface, but it instantly decomposes the water with which it is in contact owing to its great affinity for oxygen. A freshly-cut surface is immediately covered with a film of oxide. It is therefore necessary to keep the metal under naphtha or rock oil; though even so protected it will tarnish in time, and the only way of preserving its brilliant lustre indefinitely is to seal it in a high vacuum tube. It is the metallic base of potash (*q.v.*).

Potassium was first isolated by Sir Humphry Davy in 1807. Man-kind had long been familiar with the carbonates of potassium and sodium, but had regarded them as identical. They were called fixed alkali by the Arabian alchemist Geber to distinguish them from ammonium carbonate, which he called volatile alkali, and it was not till 1736 that the French chemist Duhamel showed that the alkali of common salt was a different thing from that of wood ashes, potash, and from that time the latter was considered and described as vegetable alkali and soda as mineral alkali.

Later Klaproth, the Austrian chemist, showed that the so-called vegetable alkali was found in various mineral substances, and the term potash was given to this alkali, and natron or soda to the mineral or common salt alkali. Both these substances, however, continued to be regarded as elements until Davy's discovery. The French chemist Lavoisier and others had for some time suspected their compound character. Davy obtained the metal by passing an electric current through a slightly moistened piece of caustic potash contained in a platinum dish; the metal appearing at the negative pole, while oxygen was evolved at the positive.

Potassium does not occur native in the crust of the earth, but is very widely distributed, as a constituent of felspar and mica, and thus of all granite rocks; the mineral syl-vine or silvite is a chlorite, leucite a silicate, of potassium; nitre or salt-petre (*q.v.*) is crude nitrate of potassium; it is found as carbonate mostly in the ashes of all plants, particularly in those of seaweeds; in the residues of the manufacture of beet sugar, and in the "suint" or grease of wool; carnallite, the mineral of the famous potash formations of Prussia, consists of from 16 p.c. to 27 p.c. of potassium chloride; while sea water contains sufficient of this latter salt to make its extraction from that source profitable in certain suitable localities, as on the shores of the Mediterranean Sea.

The metal may be obtained by reducing the carbonate by means of carbon and distilling the resulting porous mass; the process most generally now used, devised by the French chemist Castner, consists in reducing the hydrate—caustic potash—in an iron crucible by means of carbon and a finely divided metal or a metallic carbide, the potassium being distilled over from the crucible as the reduction proceeds, and received in a separate vessel under petroleum. Potassium is a valuable chemical reagent in analytical work, but has no direct metallurgical uses, though in the form of cyanide of potassium it is the second most important agent in the extraction of gold from its ores.

POTASSIUM SALT. Caustic potash, or potassium hydroxide, is prepared by the interaction of potassium carbonate and milk of lime, the clear solution which results being evaporated in a silver vessel until all the water is driven off. The caustic potash, whilst still liquid, is poured into moulds to form, when cold, white sticks, which are characterised by their deliquescent properties. The name caustic potash is derived from the fact that this substance rapidly destroys both animal and vegetable substances with which it is brought into contact. Caustic potash is employed for making soft soap. Potassium bromide, much used in medicine, is made by decomposing bromide of iron by potassium carbonate, the iodide of potassium, another medicinal salt, being prepared in a similar manner. Potassium chlorate is used as an oxidising agent, and for many purposes in industrial chemistry, such as the manufacture of matches, fireworks, and in calico-printing. The method of making it

is described in the article on Chlorates (*q.v.*). Potassium silicate is dealt with in the article Water-glass (*q.v.*).

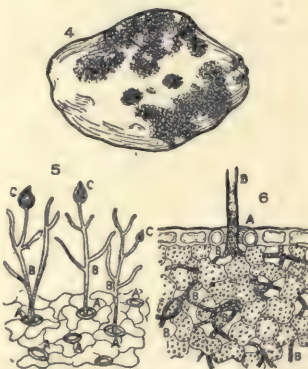
Potassium cyanide, when pure, is a white crystalline substance, which will melt without decomposing. It is soluble in water, and is a compound of potassium with cyanogen according to the chemical formula 4KCN . It is most conveniently prepared from common yellow prussiate of potash by heating with potassium carbonate. Potassium cyanide has long been known as a solvent of gold and other metals, and has been, and is still, largely used in the art of electro-plating. The successful application in 1889-90 of the MacArthur-Forrest process of extracting gold from its ores by a weak solution of potassium cyanide led to an immensely increased demand for this chemical, with the result that the production increased from under 100 tons per annum to over 6,000 tons in a few years. The substance is still used in the gold industry, but is being largely displaced by the more conveniently produced sodium cyanide. Potassium cyanide is also used in photography. It is a powerful poison. See Carnallite; Cyanide Process; Nitrate; Pearl Ash; Saltpetre.

Potato. (*Solanum tuberosum*). Tuberous rooted perennial plant of the natural order Solanaceae. It is a native of S. America; it is said to have been introduced from Peru into Europe by Spaniards early in the 16th century and into Britain by Sir Walter Raleigh about 1585. Potatoes require a soil which is rich and deep, but at the same time contains sufficient sand, or other light material, to ensure efficient drainage. They should never be grown two years in succession upon the same piece of ground, but, in the kitchen garden, should take their place in the three-year rotation with the other root crops. This system of rotation will help to prevent potato disease.

Animal manure should not be dug into ground intended for potatoes, but a little superphosphate of lime may be applied with advantage previous to planting. Wherever land is available near the sea-side, potatoes should be planted freely, as seaweed, which is easily obtainable, forms an excellent and inexpensive manure. A S. aspect is the best for early varieties of potatoes, but any ordinary position will suit the main crop varieties.

Seed potatoes should be planted in Feb., March, and April, about 12 ins. apart and 4 ins. deep, with a distance of from 18 ins. to 2 ft.

between the rows. The later varieties, planted in April, may have a little extra space allotted to them. The seed potatoes should be cut up into sections, each containing an eye, and not planted whole, which is a wasteful habit. As soon as they are about 6 ins. in height, the young plants should be earthed up, and the ground should be kept free from weeds by a liberal use of the hoe. The potatoes will be ready to lift as soon as the foliage, or haulm, dies down, and the process of lifting should be carried out on a dry day. The tubers should be stored in a cool shed to shelter them from light, air, and frost.



Potato. 1. Under side, and 2. upper side of affected potato leaf illustrated in healthy condition in 3. 4. Diseased tuber. 5. Highly magnified portion of under surface of diseased potato leaf: A, Stomata or pores through which protrude filaments, B, of Phytophthora, bearing sporangia, C. 6. Highly magnified portion of diseased leaf, similarly lettered to 5, showing phytophthora in tissues of leaf. 7. Tuber affected with Spongospora scabies

There have been over one thousand different varieties of potatoes, but, owing to their susceptibility to potato disease, very few sorts are of cultural worth, or marketable value. The secretary of the board of agriculture, Whitehall, S.W., issues from time to time a list of varieties of potatoes which have been tested and found to be disease-resisting up to the time of the publication of the list.

Potato disease (*Phytophthora*

infestans) is a mould-like fungus of the division Phycomyceteae, which in some districts in certain years causes the ruin of the potato crop. The mycelium or vegetative part of the plant consists of minute threads, not jointed or divided into cells, which permeate the cell structure of the potato plant, extending from leaf to tuber.

In plants hitherto entirely free from the disease inoculation usually takes place by a spore of the phytophthora settling upon a leaf and, on germination, piercing the green tissue, which then turns black and shows on both surfaces of the leaf. The black patch increases rapidly, and around its margin a delicate white mildew forms, from which spores are liberated to infect neighbouring plants. The mycelium passes into and right down the stem, entering all the tubers formed and forming at its base. As a rule, but not invariably, the presence of the disease in the tuber is manifested by brownish patches on the surface and in the flesh. By means of such infected tubers the disease is perpetuated from year to year, and spread from place to place by the sale or exchange of seed-tubers. All suspected tubers should be destroyed by fire, and infected haulm should be at once burnt. See Agriculture.

Potato Spirit.

Ethyl alcohol made from potatoes. The potatoes are heated by means of steam to a temperature of $140-150^{\circ}\text{C}$, under a pressure of from two to three atmospheres. The mass is then removed and mashed with malt at a temperature of from $57-60^{\circ}\text{C}$, during which process the starch of the potatoes is converted

into sugar. The mash is then fermented with yeast to form ethyl alcohol, which is separated by distillation. See Distilling.

Pot-boiler. Slang term for a picture painted, or an article or book, written simply for the sake of obtaining money. It is a work that deliberately falls short of the artist's or writer's standard, but will fetch a price in a particular market, and so help, figuratively speaking, to "boil the pot."

Potchefstroom. Town of the Transvaal, S. Africa. It stands on the Mooi river, at an elevation of 4,000 ft., 88 m. by rly. S.W. from Johannesburg. The buildings include an agricultural college, connected with an experimental farm, and it is the centre of a fine agricultural country. There are gold mines in the neighbourhood. The town has a large park, fine golf links, and a lake formed from the river here. It was founded by a band of wandering Boers under Potgieter in 1839, and was for some time before 1863 the capital of the little Boer republic. In 1862, during the civil war, it surrendered to Kruger after a comparatively harmless bombardment. In the war of 1880-81, a small British force surrendered here to the Boers, after a stubborn defence. On June 11, 1900, Colonel B. T. Mahon entered the town without opposition from the Boers. Pop., whites, 9,600.

Poteen or **POTHEEN** (Irish *poilin*, little pot). Whisky illicitly distilled by Irish peasantry. The making of poteen arose at the end of the 18th century owing to the government's refusal to license small stills in Ireland, and the smuggling became so general that, in 1815, to discourage illicit distilleries, licences were granted to stills of only 40 gallons' content. Poteen is still occasionally made in remote parts of Ireland. See Pot Still.

Potemkin, GREGOREI ALEXANDROVITCH, PRINCE (1739-91). Russian statesman. He was born Sept. 27, 1739, near Smolensk, of an ancient Polish family. One of the conspirators who dethroned Peter III in favour of Catherine II, he early attracted the notice of the empress, and in 1762 became a gentleman of the bed-chamber. In the war against Turkey, 1771, he was made lieutenant-general. He was responsible for the partition of Poland and the conquest of the Crimea, 1783, which was accompanied by the wholesale butchery of some 30,000 Tartars. In 1787 he declared war against Turkey, and, as commander of the Russian army, took Ochakov, Dec. 17, 1788. He died near Jassy, Oct. 15, 1791. Potemkin owed much of his influence with Catherine to his handsome appearance, which earned him the epithet of the Russian Alcibiades. See Memoirs, trans. from the German, 1812.



Prince Potemkin,
Russian statesman



Potchefstroom, Transvaal. Church Street, the principal thoroughfare

Potent. In heraldry, a fur represented by crutch-like figures of white and blue, placed in rows, the base of the white against the base of a blue. The variants are, counter-potent, in which the bases of one tincture are placed against bases of the same; and potent-counter-potent, in which the rows are so arranged that the base of a metal figure rests on the centre of a coloured crutch head, and so on alternately. If the tinctures differ from the above the fact should be mentioned. See Cross; Heraldry, colour plate.

Potential. Broadly, a term meaning power to do work. Whatever form a particular technical definition of potential may take, it will always include this sense. A steam boiler under pressure, an elevated body of water, a cylinder of compressed gas or air, all have potential, i.e. power to do work, whenever the necessary conditions are satisfied. The essential factor of these conditions is always a difference, which may be said to be a difference of pressure. Two steam boilers, both at the same pressure, have no potential with regard to one another; neither can do any work against the other; but when either is connected to a condenser, or opened up to the atmosphere through a steam engine, it can do work by virtue of the difference of pressures which thus arises. Its potential is measured by these differences of pressure.

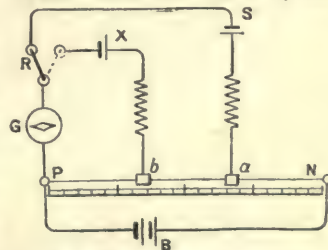
In electricity, the term is used for the work done in charging a body with a positive charge taken from a body in which the electrical tension is zero. The earth itself has potential; it may be positive or negative at any point, but it is something. It is, however, so little that its amount is neglected, and it is regarded as nothing—zero potential—and is the starting-point, therefore, in practical measurements of electric potential, precisely as "sea level" is the starting-point in the measurement of the heights of mountains.

All practical purposes are served by regarding electric potential as pressure, corresponding precisely

to the pressure of the steam in a steam boiler; while it is converted into work by falling from a higher to a lower pressure, which may be zero or something intermediate. Hence it is regarded as potential difference and commonly expressed by the letters P.D.; while another expression used for it is electromotive force (E.M.F.). It is measured in volts, which correspond to pounds or atmospheres in the measurement of steam, air, or gas pressure. Thus, when it is said that the voltage of an incandescent electric lamp is 200, it is meant that a potential difference (P.D.) or electromotive force (E.M.F.) of that pressure or intensity is required to force through the lamp the necessary quantity of electricity to raise the filament to the temperature needed, in order that it may give out its proper measure of light. See Electricity; Unit, Electric.

Potentiometer. In electricity, an instrument for measuring or comparing the electromotive force (E.M.F.) of a cell, or of a current passing through a resistance. The potentiometer method of ascertaining the E.M.F. of a cell has the advantage of doing so when the cell is giving no current, and therefore developing its full pressure.

The principle is explained by the diagram, in which X is the cell under test, S a standard Clark or Weston cell, B a battery of greater E.M.F. than either X or S, and



Potentiometer. Diagram illustrating principles of the instrument. See text

N P a wire of high resistance with sliders *a*, *b*. The cell positive terminals are all connected with P (those of S and X alternatively through switch R). Galvanometer G is interposed between R and P.

First, assume S to be connected to slider *a* on P N, and with P through R. Current from B will flow from P to N, and, encountering resistance in P N, will tend to divide and shunt part of itself through G and S to *a*. At the same time S tends to send current in the opposite direction, namely, from S to P. Galvanometer G is deflected in one direction or the other, according as the E.M.F. of B or S predominates. By sliding *a* along the wire the two currents may be brought into equilibrium, as will be shown by G not being deflected. Cell X is then balanced in like manner against B by slider *b*, and

$$\text{E.M.F. of } X = \text{Pb} \\ \text{E.M.F. of } S = \text{Pa}$$

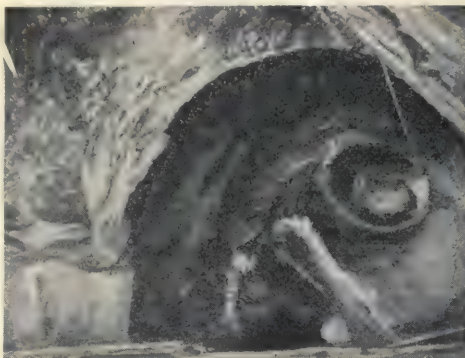
The E.M.F. of S is known; therefore that of X can be calculated.

Potenza. Prov. of S. Italy. It is co-extensive with the compartimento of Basilicata, and is bounded N. by Foggia, S. by Cosenza, E. by Lecce, and W. by Salerno. It has a seaboard on the Gulf of Policastro on the W. and the Gulf of Taranto on the E. The land slopes gently from the Apennines on the W., and is well watered. The chief products are cereals, wine, and oil. Its area is 3,855 sq. m. Pop. 490,000.

Potenza. City of Italy, capital of the prov. of Potenza. It is picturesquely placed on the E. declivity of the Apennines, near the source of the river Basiento, 103 m. E. by S. of Naples. Surrounded by medieval walls and fortifications at an alt. of 2,700 ft., it has one of the coolest climates in Italy. It has a fine cathedral, built in the Doric style. The city was almost destroyed by an earthquake, 1857. The old Roman town of Potentia lay some 465 ft. lower down the mountain side. Pop. 18,000.

Potgieter, EVERHARDUS JOHANNES (1808-75). Dutch poet and critic. Born at Zwolle, June 17, 1808, he worked in an Antwerp business for some time, travelled to Sweden, and, settling in Amsterdam, issued, with Bakhuizen van den Brink, a literary journal, *De Muzen*, 1834-36. In 1837 he founded *De Gids*, an able literary periodical. His prose works include *Het Noorden in Omtrekken en Tafereelen*, 1840; and his most famous poem, *Florence*, appeared in 1868. He translated several English novels into Dutch, and died at Amsterdam, Feb. 3, 1875.

Pot Hole. Hollow in a river bed which is deepened by the gyration of accumulated stones by the current. In soft rock these holes often attain considerable size. In a limestone region, after having drilled a pot hole, the water often reaches a marked plane of strati-



Pot Hole in the Glacier Garden, Lucerne, seen from above, showing the stone which has caused its formation

fication, i.e. the division plane between two beds or strata of rock, and along this it dissolves the rock, in the course of time producing a cave. Such limestone pot holes become shafts or swallow holes, down which the river disappears. See *Giant's Kettle*.

Poti. Seaport of Georgia, Transcaucasia. It is in the dist., and 60 m. W., of Kutais, and stands where the Rion falls into the Black Sea, and is a terminus of the Transcaucasian railway. Its exports are manganese, maize, and wheat. Poti was ceded by Turkey to Russia in 1829. It is the ancient Phasis. Pop. 17,500.

Potidaea. Town in Chalcidicæ, ancient Macedonia. Although a Corinthian colony, it was a member of the Athenian confederacy, and its revolt in 432 B.C. was one of the causes of the Peloponnesian War. After a two years' siege, it was taken by the Athenians. In 356 it was destroyed by Philip of Macedon.

Potlatch (Chinook, from the Nootka *patshall*, a giving). Name of a social custom prevalent among the American Indians of the N. Pacific coast. It consists in a ceremonial giving of presents, the

acceptance and repayment of which with interest are compulsory. It is often accompanied by the destruction of much property by the owner, who challenges another man to do the same or better.

Pot Metal. Name given to glass that has been coloured by additions of metallic oxides. The glass is coloured in the melting-pot with

the oxides in contradistinction from that which has only been surface coloured. See *Stained Glass*.

Potomac. River of the U.S.A. It is formed by the junction of two branches, which rise in the N. of West Virginia, and unite about 14 m. below Cumberland in Maryland. The main river follows a general S.E. course of 365 m.



Potosi, Bolivia. Old gateway through which is seen the famous hill from which over £500,000,000 worth of silver has been extracted. Top, right, Plaza Pichincha, showing the cathedral and the Independence column

and enters Chesapeake Bay by an estuary from 2 m. to 7 m. broad, and nearly 80 m. long. It forms a cataract about 35 ft. high, 15 m. above Washington, at which city it becomes navigable. The Shenandoah is its largest tributary. There was much fighting around the river during the American Civil War (q.v.).

Potomac Group. In geology, a series of deposits of the Lower Cretaceous and Jurassic period, found in N. America. Rocks of this group consist chiefly of sands, gravels, and clays, and are a source of glass sand and iron ores. They are typical in New Jersey up the Mississippi valley to Tennessee, etc.

Potosí OR **CERRO RICO** DE **POTOSÍ**, Mountain, dept., and town of Bolivia. The mt. rears to an alt. of 15,290 ft., is snow-capped, and is the site of one of the richest silver mines known. The Cerro is 18 m. in circumference, and the borings and shafts made in the mt. sides in search of silver exceed 5,000. It is estimated that the total yield of silver has exceeded in value \$500,000,000. The dept. occupies the S. W. of the country and adjoins Chile on the W. and Argentina on the S. It is crossed in the middle by the Cordillera de los Frailes, E. of which the dist. drains to the Pilcomayo; in the W. is the extensive Salar de Uyuni. The surface is generally mountainous, but it contains the extensive salt swamp known as Salinas Grandes. It yields silver, gold, copper, and tin. Its area is 45,000 sq. m. Pop. 400,000.

The town of Potosí, one of the highest inhabited places in the world, stands at 13,600 ft. alt. on the side of the mt.; much of it is in ruins, having been, in part, deserted. It contains the government mint, and a large granite-built cathedral. In the 17th century the city had a pop. of 150,000. Pop. 25,000. See Bolivia.

Pot-pourri (Fr., rotten pot.). French translation of *olla podrida* (q.v.), the name of a Spanish dish, made up of different kinds of meat and vegetables, minced and stewed. It has come to be used for any composition, literary or musical, put together without regard to order and with no particular connexion between the parts. The name is in common use for a mixture of dried rose petals, lavender, and spice kept for its fragrance in china jars.

Potsdam. Town of Prussia, Germany. It stands on an island in the Havel, 16 m. from Berlin, on the main rly. line to Magdeburg, and is also served by steamers. Around are a number of lakes formed by the Havel. It has some manufactures, including textiles, chemicals, and optical instruments, but is chiefly known for its palaces, until 1918 the residences of the Hohenzollern family.

The first palace was erected overlooking the Havel about 1660, and was afterwards improved by Frederick the Great and other kings. Outside the town, in a large park, is the small palace of Sans Souci built by Frederick the Great, who also built at the other end of the park a newer palace, an enormous brick edifice. He also extended the park and laid it out in the French style; in it are an orangery and a model of a Pompeian villa. The palaces have also memorials of Voltaire. There are several other palaces. The churches include S. Nicholas, the garrison church, wherein Frederick

the Great was buried, and the peace church built 1845-50, attached to it being the royal mausoleum. Other public buildings are the town hall and the theatre. There are large squares and pleasure-grounds. The Brandenburg Gate resembles a Roman triumphal arch. Potsdam is the capital of the province of Brandenburg and until 1918 was a military centre. Originally a village on the Havel, it was made a town in the 14th century. Pop. 62,000.

Potsdam Sandstone. In geology, name given to rocks of the Upper Cambrian. So called from their typical formation at Potsdam, New York, they consist of red or yellow sandstones, and are extensively used as building stones. They are found on the edge of the Adirondacks, in Virginia, Michigan, and Wisconsin. See Cambrian.

Potsherd. Fragment of an earthenware pot, or any broken piece of earthenware. In archaeological exploration such sherds are of great importance, often enabling the successive layers in ancient

settlements to be identified. A W. Asian ruin-mound may exhibit neolithic sherds at the base and Byzantine or Arab pottery on the surface, with several civilizations between. Old foundations beneath London may prove to be Romano-British, Saxon,



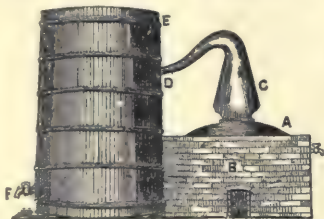
Potsdam, Germany. 1. New Palace, built 1763-69. 2. Town Hall, built in 1754. 3. Brandenburg Gate, celebrating the victories of Frederick the Great, built in 1770. 4. Palace of Sans Souci. 5. Town Palace, rebuilt in 1751



Potsherd of Egyptian glazed ware, c. 1800-1300 B.C.

or Tudor. The largest heap known is Monte Testaccio, in Rome, 1,000 paces round by 115 ft. high, comprising fragments of imported jars, and proving an extensive trade with Spain and Africa. Potsherds sometimes illustrate decorative styles otherwise unknown, and in Ptolemaic and Roman Egypt were largely used for business memoranda. In Anglo-Saxon graves they were intentionally thrown upon the body, a superstition mentioned in Hamlet. See Ostraca; Pottery.

Pot Still. Early and simple form of still used in distillation. In it the heat of the fire is applied di-



Pot Still of common type. See text

rectly to the pot containing the mixture. It is chiefly used to-day for distilling illicit whisky, either from grain or malt. The diagram illustrates a common form of still. The still, A, encased in brickwork, B, is directly over the fire. The head of the still, C, is attached to the condenser, D, which enters the tub, E. There the vapour is condensed and is drawn away into a receiver at F. See Distilling; Potteen; Still; Whisky.

Potter, PAUL (1625-54). Dutch painter. Born at Enkhuysen, he was a pupil of his father, Pieter, at



Paul Potter, Dutch painter
After B. van der Helst

Amsterdam, and of Jakob de Wit at Haarlem. He painted landscapes with horses or cattle, generally on rather a small scale; but his famous Bull, now at the Mauritshuis, at The Hague, is nearly life-size. He passed his life in Holland and died at Amsterdam. One of his most typical paintings, Man

the Hunted, was in the Hermitage Museum, Petrograd.

Potteries, THE. District in N. Staffordshire, England, including the towns of Stoke-upon-Trent, Hanley, Burslem, Tunstall, Longton, Fenton, etc., all of which were united, March 31, 1910, to form the county bor. of Stoke-upon-Trent. The Potteries is the principal centre in the kingdom for the manufacture of earthenware, china, etc., and measures 9 m. in length by 3 m. in breadth. Here is the

N. Staffs. coalfield. See Stoke-upon-Trent; Tunstall, etc.

Potter's Bar. Eccles. parish and village of Middlesex, England. Situated on the Great North Road, 13 m. from London and 3 m. N. of Barnet (*q.v.*), on the G.N.R., it is under the control of the South Mimms rural district council. The parish church of S. John was built in 1835. Here, on Oct. 1, 1916, a Zeppelin was attacked and brought down in flames by Lieut. W. J. Tempest, D.S.O., of the R.F.C.

POTTERY: FOR USE AND ORNAMENT

H. Barnard, of J. Wedgwood & Sons, and E. G. Harmer

This Encyclopedia contains shorter articles on all the main forms of ware, e.g. Coalport; Crown Derby; Worcester, etc. See also Greek Art; Rome; Art; China; Jug, etc.

In its widest sense pottery embraces all earthenware fabrics, vessels and building materials, human and animal figures, implements such as spindle-whorls, and personal ornaments. Fashioned out of the moist plastic earths called clays, with or without other materials, it is hardened by air-drying or by firing. Fired pottery becomes stone-like, and furnishes some of the most imperishable relics of early culture.

Whether pottery was known to palaeolithic man or not, its presence in Danish kitchen-middens apparently dates the invention back to the beginnings of neolithic Europe. But its cradle-land more probably lies E. of the Caspian, whence it spread to the Persian Gulf and, according to British Museum excavations in 1919, to pre-Sumerian Eridu and Ur. Modern primitive practice suggests that closely plaited basketware, caulked with clay inside or out, may through accidental contact with hearth-fires have brought about the discovery that watertight vessels are producible by firing clay. Some early examples were modelled on basket forms, and the decorated styles called banded pottery show incised lines simulating suspension cords and bands.

These primeval fabrics were fired on the open hearth by the women of the homestead, who were their sole makers and users. Most of the utilitarian hand-made pottery of the world has been, and is, produced by them; their crude, undecorated jars are still fired on the hearth in the outer Hebrides.

In process of time the forms of vessels became more and more specialised, according to their use for storing foodstuffs and beverages as well as household and toilet articles, both for the living and the dead, for cooking and serving food, and—still later—for interring the

corpse or its ashes. During several millenniums prehistoric Egypt devised hundreds of forms, ranging from shallow bowls to complex flasks equipped with spouts, handles, and pedestalled feet. The fabrics were moulded, modelled, or built up with the free hand by adding consecutive pieces or ribbons of clay. The fashioning of vessels on rounded pebbles or pivoted disks, enabled the potters to turn the fabrics towards them as they proceeded. This culminated in the potter's wheel, perhaps in early dynastic Egypt, where also the open hearth was replaced by the pot-oven or kiln.

Simple methods of decoration, by finger-marks, incised lines, and smears of ochre, were followed by the admixture of sand, powdered sherds, and other materials, to avert cracking. The roughened surfaces encouraged the use of slip, thin fluid clay applied before baking. This in later ages was supplemented by various processes of burnishing, varnishing, enamelling, and glazing.

Some authorities hold that the uniform methods of primitive potters are best explained by regarding the art as the invention of one people, carried by cultural drift round the world. This accounts for the lack of pottery in remote regions such as Tasmania and Fuegia, peopled by early migrations, and the ignorance of the wheel in other regions, including all pre-Columbian America N. of Tierra del Fuego, which were peopled after Old World pottery began, but before the wheel was devised. One of these migrations apparently reached Alaska from Siberia, and spread thence over arctic America. Another reached middle America, perhaps from S.E. Asia, as suggested by tripod pots and other forms which attained a high development in ancient Mexico and the Mississippi mound

region, and may have originated the decorated pottery of the Andean peoples as well. This was marked by simulation of natural objects, and by skilful human portraiture. Fine pottery is still produced in the Pueblo region.

Modern African methods often follow ancestral tradition. Some Berber tribes produce utilitarian fabrics of predynastic Egyptian type. Choicer work comes from the Kabyles and the Uganda peoples. In W. Africa and Congoland local influences have given rise to gourd-like forms. Both there and elsewhere decoration is largely based upon textile and basketry patterns, primarily because both industries form part of women's work.

E. G. Harmer

Greek and Egyptian Pottery

The Greeks held the potter's art in high esteem. Their skill undoubtedly came from Egypt, and vases of good form and workmanship date from 900 B.C., being made of well-prepared, fine-quality clay. Three distinct styles exist, primitive, geometric, and archaic, and the fine vase period follows, which extended over 400 years from the 7th to the 3rd centuries B.C. During the Bronze Age the lake-dwellers flourished at Bourget in Savoy, and discoveries show that they attained skill.

Some pieces show signs of painting, and were evidently used for decorative purposes, but the sense of aesthetic value was new to mankind at this period—about 450 B.C. A Celtic civilization immediately preceded the introduction of Roman arts into Britain, and urns rudely shaped, but made upon the potter's wheel, suggest that Roman influence had already made itself felt.

Roman ware divides itself into several classes, Samian, Grey, and Upchurch wares, beside the coarse native pottery made where suitable clay was found. Samian, the best known ware, was largely made on the Continent, chiefly in Auvergne, but some was made in Britain. That the skilful and luxurious Romans were not content with coarse wares is proved by the discovery of pieces of glazed and decorated pottery showing refined taste.

Great Britain's artistic light came from without. From the East enamelled earthenware was introduced into Europe, mainly through such intercourse as that between the Moors and Spain. Moorish potters established themselves in Malaga and Valencia, and tiles in the palace at Seville, and the famous Alhambra vase, show their skill. By them was founded the school of ornament

now known as Hispano-Moresque. The expulsion of the Moors from Spain in the 15th century caused the manufacture to cease, but the art had already spread to Majorca and Sicily, the way being thus prepared for the great works of the Italian Renaissance. The Italians, ever ready to seize and develop an artistic idea, soon improved upon the work of the Majorcan potters.

Many of their cities became famous for ceramic productions, Gubbio, Faenza, from which comes the name faience, Siena, Urbino, Pesaro, and Castel Durante, for instance. Among the great masters of the art are Luca della Robbia, Giorgio Andreoli, and Francesco Xante.

Decline came soon after the beginning of the 17th century, but the influence of the wares was felt in many directions. Delft in Holland made a ware which may be regarded as a compromise between Italian majolica and Chinese porcelain; its methods taken from the former, and designs from the latter. Lambeth made pottery at a very early date, and in 1676 a Dutch potter settled there and took out letters patent for the manufacture of earthenware "after the way practised in Holland."

Italian and French Pottery

Probably a piece of Italian majolica inspired Bernard Palissy with the desire to become a potter. This was in 1542, and for 15 years he struggled and suffered, to see his efforts at last successful.

Upon the decline of the Italian potteries, the artists and artisans migrated to France, lured by the offers of support from French nobles. Several manufactories of enamelled faience ware were established, the likeness between late Italian and early French being very marked. At Nevers pottery was made at the end of the 16th century, and Rouen started a factory about 1644. The wars and famine of 1712 so depleted the royal treasury that Louis XIV sent all his gold plate to the mint, and commanded the Rouen potters to furnish the royal tables with ware. This caused a sudden demand, and no trouble was spared to make their work fit for a king.

A minor but nevertheless important factory of faience was Moustiers. It was established in 1700, and carried on the style of Rouen with a treatment more simple, and having an original and new note, in that a variety of colours were used instead of blue alone. Faience was developed in Germany in an entirely different direction. Germany is the land of

the stove, and here is a happy instance of the homely use of faience. No other material could be used with equal satisfaction and effect.

The early English potters of the 16th and 17th centuries devoted themselves to the production of ware of a homely character. Painting on a dark clay with one of a lighter tone occurred to the Romans, but it was left to the Staffordshire potters to rediscover it. For a long time they confined themselves almost entirely to decoration of this class on porringers, bowls, and "tygs," or many-handled loving cups. Wrotham, in Kent, was an important centre for this class of slip decorated ware.

Staffordshire Wedgwood Ware

Staffordshire now received the greatest impression ever brought to bear upon it. Two German brothers, Elers by name, settled there and began to make a fine red ware. A Burslem potter, named Astbury, obtained admission to their works as a labourer, and informed himself of many of their methods. Accident brought to his notice the peculiar properties of flint, which he calcined, ground to powder, and combined with his earthenware body; this produced a superior article, on which he turned to account the processes learned from the Elers. Astbury, in his turn, largely influenced his fellow-workers, and an enormous advance was made upon the slip wares and the productions of Fulham.

Josiah Wedgwood is, perhaps, the best known English potter, and justly so, for he did more to raise the quality of English ware than any other maker. Deriving his artistic inspiration from the antique, he produced beautiful shapes, improved existing materials, and by persistent and energetic research discovered new mixtures. He worked from 1744 till his death in 1795, and was the most versatile of potters. He called to his aid John Flaxman and most of the well-known artists of his time. Yorkshire for years made quantities of ordinary wares, but Leeds claims a place in ornamental ceramics. This is in the finely executed pale-cream-coloured perforated ware which was a development of the earlier and similar class of pottery made in Staffordshire, though greatly extended in range and elaborated in detail.

Side by side with the growth of earthenware was that of the pottery called stoneware, so named from its excessive hardness. It came to Britain from the Low

Countries and Germany, where it was largely made in the 16th century. Generally it is classed under the title *Grès de Flandres* or Cologne ware, the chief centres of manufacture being Siegburg, Raeren, and Cologne. The ware was finished in the natural colour of the clay, and was glazed during the firing with salt. Some has been decorated with painted bands of purple and blue, applied on the clay before firing. At Fulham was established the first factory in England for making stoneware. This was done by John Dwight in 1611. He made fine busts and statuettes as well as ordinary useful pieces. Mortlake followed on the same lines in 1752. Fine salt-glazed stoneware was made in Staffordshire, Burslem being the centre of manufacture, and producing pieces as early as 1690. By a similar progression the ceramic art made its way East. As earthenware and faience developed in the West, so porcelain more especially occupied the Oriental potters.

Chinese Porcelain

The Chinese must have the credit of being the real inventors of porcelain. Various dates are assigned; it is, however, certain that great perfection was attained during the Ming dynasty, 1368-1644, when they produced the wonderful *sang de bœuf* and peach-bloom effects. Early specimens of porcelain treated with simple cobalt-blue designs were exported to every civilized country and found their way into Europe, which resulted in the manufacture of porcelain by potters in almost every Western country.

The potters of Japan followed mainly on the lines laid down by the Chinese, but they proved themselves by far the most progressive of Orientals, as they coupled with their native taste and manual dexterity a ready acceptance of Western ideas. So versatile a people produced potters who soon began to realize the plastic properties of clay, and every variety was seized upon to express the artist's thoughts, the outcome being a great advance in earthenware and stoneware lines also.

France preceded Germany in the production of porcelain, but before the discovery of the true clay it was artificially composed; the first soft paste was made at St. Cloud about 1698. In 1740 a factory was established at Vincennes, which was shortly after removed to Sèvres. Soft paste only was made up to 1768, when the true clay was discovered. True porcelain, made as the Chinese wares, was a distinction long left to Dresden.

The year when porcelain was first made in England is not known, but Chelsea wares stand first in point of time, the earliest known pieces being dated 1745, at which period it showed good workmanship in a marked degree. Its paste was artificial and harder than Sèvres. London also made porcelain at Bow, which probably originated with a patent taken out by Heylyn and Frye in 1744. The whole of the plant and stock was purchased in 1770 by William Duesbury, and transferred to the Derby works, which had probably been in existence some years, as a sale of Derby wares took place in London in 1756. Great progress was made under the proprietorship of Duesbury, who also purchased the Chelsea works, where was produced the china known as Chelsea-Derby, or Chelsea models made in Derby paste.

Worcester possesses one of the factories that made porcelain in the 18th century. John Wall, in 1751, discovered the secret of making porcelain. Many of his fellow-citizens approached him with a view of purchasing his invention, and the result was the forming of the Worcester Porcelain Co. In 1755 William Cookworthy discovered the true kaolin or china clay in Cornwall, which was quickly and extensively used at Worcester. Besides this, Cookworthy started a factory at Plymouth about 1768, which carried on only three years and was then transferred to Bristol. Plymouth paste was a true hard porcelain, and Bristol body is the hardest known, harder even than the ideal Chinese ware. These works were closed in 1781.

Enamelled Ware

There is also an influence in Europe which shows that the productions in pottery in India and central Asia found their way West. The origin of Indian pottery is obscure, but almost every village had its potter's field and craftsmen, the variety of work being very great, though the style is similar. Persian pottery has a rough sandy body, coated with a siliceous enamel, semi-opaque; beautiful specimens date from the 15th century. Damascus has given name to a large section of enamelled wares, whether they emanated from that city or not; this ware was largely imported into Europe in the 15th century, and it deserves special mention, as no doubt it kindled the spark of emulation which gave Italy the glorious works of Gubbio and Faenza. Rhodes and the neighbouring islands, as also the Arabs or Sara-

zens, produced ware with bold designs and beautiful colourings during the 16th century.

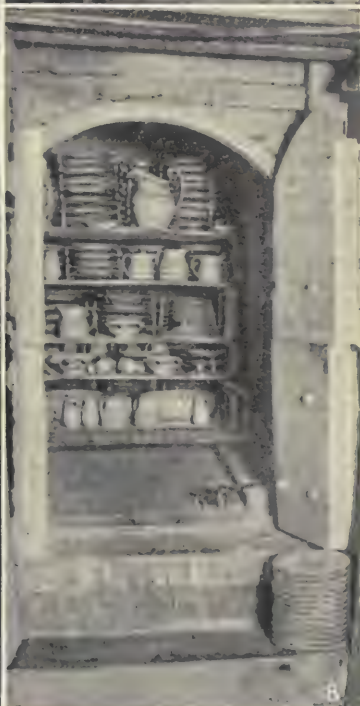
During the whole of the 19th century pottery manufacture increased by leaps and bounds in every country; the introduction of machinery added tremendously to the output, and processes too numerous to mention were invented; but on the whole it may be said that they all centred around and developed and enlarged those of the late 18th century. Sèvres and Dresden have both carried on to the present day, and so also have Wedgwood and the Worcester factories. The old Derby works ceased and a new factory took its place, and such well-known names as Spode, afterwards and still Copelands, Minton, and Doulton were started and still exist.

POTTERY MANUFACTURE. Clay exists in many districts owing to the decomposition or disintegration of stone, but for pottery it is seldom used in its natural state. Admixtures of all kinds of material are used by different manufacturers, but in the main calcined bone, kaolin or china clay, Cornish stone, and flint are the foundation of all mixtures.

Preparation of Clay

The clay must be washed and prepared before it is fit for use by the potter. Clay so prepared need only be mingled with water, but all hard materials, flint, stone, bone, etc., need to be finely ground. Flints are calcined, which renders them pure in colour and lessens their toughness, so that they can be crushed ready for the mill. This consists of a pan or large vat, the bottom paved with hard chert stones; in the centre revolves a shaft with powerful arms, each propelling a block of stone which travels continuously over the stone paving. The broken material is put into the vat with water, and the whole ground to an impalpable cream, called slip.

This process takes from two to eight days. When the substance has reached a sufficient degree of fineness it is run off and sifted through a silk lawn. Each material is ground separately. Then comes the slip-house, where the mingling of the different materials is carried out. When the mixing-tank has received its proper quantity, the whole is freely agitated and passed through channels containing magnets, so that every particle of iron may be abstracted. This slip has now to be converted into clay, which is effected by pressure. The clay-press contains a number of flat chambers, each lined with linen and screwed firmly



1. Mill where the clay is prepared. 2. Thrower working at potter's wheel. 3. Turning on lathe to complete the shape. 4. Pressing hollow ware; a water-ewer is being removed from the plaster-of-Paris mould. 5. Decorating a Portland vase; the work is completed in the clay state. 6. Interior of oven, showing how "saggars" are arranged. 7. Dipping in the glaze tub. 8. Interior of a rammel kiln where the last process takes place

POTTERY : SUCCESSIVE STAGES IN THE MANUFACTURE OF THE WARE

together. The slip is pumped into them; when full the pressure is continued, and the water exudes through the linen, leaving the clay within. Each chamber is then opened, and the contents, now solid, rolled up and removed.

The clay then goes through a process of kneading in the pug-mill, a cylindrical chamber with a revolving shaft down the centre having knife-like arms attached, and the clay comes out in a square-sectioned shape, which is cut off in pieces of suitable size for the different potters to carry away.

The Potter's Wheel

The potter's wheel, a small horizontal revolving table, has scarcely altered during 4,000 years, only the method of supplying power having undergone modifications. The name thrower, applied to the potter who makes upon the wheel, doubtless comes from the action of the workman as he throws the ball of clay on to the centre of the wheel. As he presses the clay with his hands, it rises in a spiral column between his fingers, to be depressed and again allowed to rise, when it is once more brought down and centred or trued. Then, pressing the thumbs into it, he rapidly forms a cylinder. With one hand inside and the other outside, he feels the thickness as he draws up and out the revolving mass, which soon becomes, under his will, a bowl, jug, or vase.

Some rough earthenware is finished when it leaves the wheel, but more generally turning upon the lathe is the process used to complete the shape, in the same manner as wood, metal, or ivory is turned. This is done when the clay has been dried to a green hardness not unlike the consistency of cheese.

Pressing is making hollow ware, i.e. such articles as soup tureens and oval shapes, with the aid of a plaster-of-Paris mould. The maker flattens out a thick slab of clay and presses it against the plaster mould, working, of course, from the inside, putting the parts together and making good the joints. Then, when the porous mould has dried the clay partially, the mould is taken away in pieces and the vessel is removed. The addition of handles, spouts, or embossments, separately made in moulds, are now stuck on, completing the shape.

Casting is done by pouring liquid clay or slip into a mould, and, when sufficient of the moisture has been taken away by the porous mould, the remainder of the slip is poured out, leaving a coating of clay of the required thickness inside. When partially dry this

shrinks away from the mould, allowing its removal, when it can be treated and finished. Handles, spouts, feet, and knobs are applied in the clay state.

The piece is now ready, when dried to white hardness, for the biscuit or bisque oven, the first fire, which changes the clay into earthenware or porcelain, the quality of the piece depending very largely upon this. The oven is a circular, dome-shaped structure about 16 ft. in diameter, with a narrow doorway, through which the ovenmen carry the "saggars" filled with clay articles until the oven is completely packed. The doorway is then bricked up and luted with clay, the fires around—six or eight—are lighted, and are maintained for about 48 hours at least. As the firing draws to completion the whole interior glows with a fierce heat. The fireman draws from several proof-holes test-pieces previously arranged, by which he can tell the state of the oven, and at the proper moment the fire-holes are closed up and the whole allowed to cool gradually; this takes as long as—sometimes longer than—the time required for firing. The pieces have meanwhile undergone a wonderful change, accompanied by a diminution in height, thickness, and weight.

Glazing and Printing

When they are drawn from the oven and have passed through the bisque warehouse for sorting, they are ready for the dipping-house, where they are glazed. Glaze is a compound of alkalis and earths to which lead is added, the mixture being first melted together and ground with water. This is then placed in an open tub, and the dipper proceeds to plunge the piece of ware into the bath, the porosity causing an even coating to adhere to the surface. The next stage is the glost-oven, where each piece has to be carefully separated from its neighbour, so that during the firing of the glaze no touching or sticking together shall result. The placing in saggars and firing of the oven is similar to that of the bisque oven. The glost fire is not so fierce as the biscuit, and is sustained only long enough to accomplish the complete fusion of the surface. Decoration, other than clay embossments and relief figurings, is sometimes under the glaze and sometimes over it.

Printing is a form of decoration which has done as much for pottery as it has for literature. The printing press used is the ordinary type of copper-plate press with rollers. The printer fills a copper plate

engraved with the pattern with colour, bossing off all the colour except what remains in the engraved lines. Then he places a piece of prepared tissue paper upon the plate, which has been brushed with a solution of soap. Both copper and paper now pass under the press rollers, and, when removed, they are warmed upon the printer's stove and the paper gently pulled off. The colour has left the engraved lines and adhered to the paper. The print is then trimmed of any superfluous paper by the transferer and laid accurately upon the ware, being rubbed firmly down on to it with a flannel boss. The colour being mixed with an oil vehicle, and the paper prepared with a water medium, the application of a damp sponge or the immersion of the piece of ware in a tub of water removes the paper, leaving the pattern upon the ware. This process is used both over and under the glaze. In the latter case a hardening-on kiln of a dull-red heat is required to remove the oil and fix the printed pattern to the ware before it undergoes the glazing process at the dipper's hands. The well-known willow and pheasant patterns are done in this way.

The painter uses a great variety of colours, all metallic oxides, and for overglaze, fluxes or colours containing glaze in the mixture are required. Thus, from gold is obtained crimson, from cobalt blue, from chromium green, from iron red, from antimony yellow, etc., but great experience is necessary, as the purity of tone, and sometimes even the colour, does not appear until after firing. Great difficulty is felt by all ceramic decorators, as some colours will not mix with others, but will in the fire react to their mutual destruction.

Method of Gilding

Gold for the best work must be of the purest quality. It is amalgamated with mercury and ground in a mill to powder, then mixed with a special oil, and applied sometimes as a print, but also in a freehand manner as painting is done. Edge lines and bands are put on circular pieces by using a hand wheel. After firing in the enamel kiln, gold has to be burnished with an agate or blood stone, or if a dull surface is required, scoured with fine sand.

The enamel kiln is the last process of manufacture. It is a muffle or closed-up wagon-shaped box of fireclay slabs, around which fire is allowed to play until the whole, with its contents carefully arranged on iron slabs, assumes a bright-red heat, or cherry-red heat, as it is technically known. Kilns filled one

day are generally emptied the next, the duration of fire only being about eight or nine hours. Some highly decorated pieces require repeated fires in both oven and kiln, going again and again with additional artistic burdens upon them until completed to the satisfaction of the designer.

Salt glazed ware or stoneware is familiar to most on such common articles as drain-pipes or ginger-beer bottles. The invention dates from about the 12th century, and consists in exposing the clay article to the intense heat of an open oven or kiln, no protection being placed between the fire and the clay; then when the ware is almost at white heat, a quantity of common salt is thrown upon the fires and dropped through holes in the dome of the oven. Volatilisation takes place, and the salt vapour clings around the ware; the silica in the clay combines with the sodium from the salt, forming a thin glass glaze on the surface of the piece, while the chlorine, being set free, escapes.

H. Barnard

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Potting. Placing plants either from the open ground or seed boxes in pots, usually for the purpose of cultivation under glass. Both pots and saucers, before using, should be scrubbed inside and out, to ensure cleanliness and proper porosity of the pots. To secure the necessary drainage, the pot should be filled to about one-third of its depth with pieces of broken pots, chips of brick, oyster-shell, broken charcoal, etc. The usual potting mixture is loam and leaf mould, with a liberal mixture of sand, the latter inducing the plant to throw out fresh roots. See Gardening.

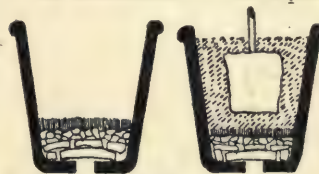
Potton. Market town of Bedfordshire, England. It is 11 m. from Bedford, with a station on the L. & N.W. Rly. The old church of S. Mary has a Norman font. The industries include engineering works and the making of leather, parchment, and beer. Potton was formerly a centre for straw-plaiting and lace-making. Pop. 2,250.

Pott's Fracture. Fracture of the lower end of the fibula. It is associated with injury of the lower articulation between the tibia and fibula, the two long bones between the knee and the ankle.

Pottstown. Bor. of Pennsylvania, U.S.A., in Montgomery co. It stands on the Schuylkill river, 39 m. by rly. N.W. of Philadelphia, and is served by the Philadelphia and Reading and Pennsylvania rlys. It has important iron and steel industries, also engineering works, rolling mills, foundries, and machine shops, and manufactories of silk, hosiery, bricks, and agricultural implements. Originally called Pottsgrove, Pottstown was founded in 1752, and incorporated in 1815. Pop. 17,400.

Pottsville. City of Pennsylvania, U.S.A., the co. seat of Schuylkill co. It stands on the Schuylkill river, 35 m. N.N.W. of Reading, and is served by the Philadelphia and Reading and other rlys. Picturesquely situated on the declivity of steep hills, it is much visited by tourists and is the centre of an anthracite region. Among industrial plants are rly. workshops, boot and shoe and shirt factories, and textile and silk mills. Its buildings include the co. courthouse and a public library. Pottsville was settled about 1800, and was made a corporate town in 1828. Pop. 21,900.

Potwalloper. Name formerly given in certain English boroughs to the man entitled to vote at par-



Potting. Sectional views showing, left, correct method of placing broken pots; right, position of plant when potting

liamentary elections. The origin of the word is doubtful, but it has some connexion with the right of boiling a pot, i.e. the right to a fire and hearth, this giving the right to the franchise. There were potwallopers in Taunton until their rights were extinguished by the Reform Act of 1832.

Pouched Rat (*Geomys*). Genus of about eight species of burrowing rodents of the family Geomyidae. They are natives of North and Central America. They have small eyes and ears, and fur-lined cheek pouches opening to the exterior. The fore-feet have strongly developed claws fitting them for digging. The best known species is the pocket gopher (*g.v.*).

Poudre B. Propellant used in the French service. It was invented by P. M. E. Vieille, and the French government adopted it in 1884 for the Lebel rifle, this being the first successful use of smokeless powder in rifled firearms. The designation Poudre B is derived from the initial of the name of General Boulanger, who was minister of war when the powder was introduced. It has always consisted of a mixture of nitrocelluloses, of which some are soluble and the remainder insoluble in a mixture of ether and alcohol, but the composition has varied from time to time, the Poudres BN (N standing for *nouveau*) containing barium and potassium nitrates, but at the present time the propellant contains no ingredients other than nitro-cellulose and a stabiliser.

For the manufacture of Poudre B, two varieties of nitrocellulose (*g.v.*) are prepared, the Abel, Thompson, displacement and centrifugal processes all being employed in one or other of the factories. The products are known as CP₁ and CP₂ (CP meaning *coton poudre*=nitrocotton), the respective nitrogen contents being 13 p.c. and 12 p.c., the former being only slightly soluble (about 8 p.c.) in ether alcohol mixture, while the latter is almost completely soluble. The proportions of the two nitrocelluloses vary, the quantity of CP₂ being 20 p.c. to 55 p.c. of the mixture.

The stabilisation of this propellant was a source of trouble at one time, the internal explosions which sank the *Iéna* in 1907 and *Liberté* in 1911 being attributed to this cause. At that time amyl alcohol was employed to stabilise the powder, but it is not very effective for this purpose, as it does not readily absorb the acids released by the slow decomposition of nitrocellulose, and it has a tendency to form acid products. In consequence the use of amyl alcohol has been replaced by diphenylamine, about 2 p.c. of this compound being dissolved in the solvent before the nitrocellulose is incorporated. This appears to have overcome all defects. See Ammunition; Cartridge; Collodion Cotton; Explosives; Nitrocellulose.



Pouched Rat. The American rodent with large cheek pouches

Poughkeepsie. City of New York, U.S.A., the co. seat of Dutchess co. It stands on the E. bank of the Hudson river, 75 m. N. of New York City, and is served by the New York Central and Hudson River Rly. and by a steam ferry. The Hudson river is here crossed by a handsome cantilever bridge almost 7,000 ft. long. Poughkeepsie is the seat of Vassar College, and contains the Adriance Memorial Library and several educational and benevolent institutions. The manufactures include iron and steel goods, and boots and shoes. Settled by the Dutch in 1698, Poughkeepsie became the capital of the state in 1778, and received a city charter in 1854. Pop. 35,000. *Pron.* P'k-ippsy.

Pouillet, CLAUDE SERVAIS MATHIAS (1791-1868). French physicist. Born at Cusance, he was educated at the École Normale, Paris. He became director of the Conservatoire des Arts et Métiers in 1831, resigning in 1849 to make a special study of physics. He is famous for his invention of the tangent and sine galvanometers and of a type of pyrheliometer, and for the research work he carried out in many branches of physics. He died June 15, 1868.

Poulaines or **POLEYNs.** Long pointed shoes worn in the 14th and 15th centuries, also termed Crackowes. It is assumed that they gained this latter name from Cracow and the former from Poland, whence, apparently, the fashion came. *See* Boots and Shoes.

Poulett. Family name of Earl Poulett. It is a variant of the name Paulet (*q.v.*).

Poulsters' Company, THE. London city livery company. Existing as a voluntary association in the middle of the 14th century, it was first incorporated by charter, Feb. 23, 1504. The office of the company, which lost its hall and other property in the Great Fire of 1666, is at 19, Great Winchester Street, E.C.

Poultice (Lat. *puls*, gen. *pultis*, pap). Soft, warm or hot composition of bread, linseed meal, etc. It is used as an external application for the relief of pain and inflammation. Fomentations made by wringing layers of flannel out in hot water are equally serviceable and more easy to apply.

Poulton, EDWARD BAGNALL (b. 1856). British scientist. Born at Reading, Jan. 27, 1856, he was

educated at Jesus College, Oxford, where he took high honours in natural science. In 1877 he was made demonstrator in comparative anatomy at the university museum and, 1880-89, he was lecturer at Jesus and Keble Colleges. In 1893 he was made Hope professor of zoology at Oxford. Elected F.R.S., he was president of the Linnean and Entomological Societies. His son, R. W. Poulton-Palmer, was a noted Rugby football player at Rugby and Oxford. He inherited

the wealth of his uncle, G. W. Palmer, M.P., and was killed in the Great War in May, 1915.

Poulton-le-Fylde. Market town and urban dist. of Lancashire, England. It stands on the river Wyre, 3 m. from Blackpool, and is served by the L. & N.W. and L. & Y. Rlys. It has an interesting church, S. Chad's, and a market cross, near which are preserved the stocks and whipping-post. At one time Poulton was a seaport. Market day, Mon. Pop. 2,400.

POULTRY AND POULTRY KEEPING

J. T. Brown, F.Z.S., Editor of The Encyclopaedia of Poultry
The Encyclopaedia contains entries on the various breeds of fowls, e.g. Dorking; Orpington, etc. See also Bird; Fowl, with their col. plates

Poultry (old Fr. *pouletrie*, cf. Eng. *pullet*) is the general term for domesticated fowls, ducks, geese, and turkeys. Poultry farming may be defined as the culture of poultry for profit derived from eggs, chicken, or table bird production, as distinct from their production as a side-line or for exhibition purposes. A poultry farm may range from five to five hundred acres, and the stock may consist of fowls, ducks, geese, and turkeys in their relative proportions or, in the case of a duck farm, of ducks only.

The individual qualifications for poultry farming necessitate a natural aptitude for the work and previous experience with poultry, preferably on a farm as a pupil, or a course of training at an agricultural college. In addition, thorough knowledge is necessary not only of fowls and their ailments, but of foodstuffs and their constituents, of mating, artificial incubation, rearing, fattening, trussing, shaping, and preparing for market.

Locality and the nature of the soil are important factors. In the British Isles, however, there are few localities in which soil and situation are entirely unfavourable to poultry production. The land should be situated at a fairly high altitude, and should be undulating and well drained naturally and artificially, with a slight slope to the S.E., S., or S.W. Lack of natural drainage and exposure to cold winds are the two great objections to flat land. The soil should preferably be light loam on a gravel subsoil, or one most nearly approaching it. Hills, woods, or belts of trees on the N. and E. are an advantage, as they afford shelter and break the force of the cold winds from those quarters; but hills on the S. and W. are great objections, for they deprive the site of most of the direct rays of the sun in autumn and winter, when sunlight is most needed for the fowls and their houses.

An abundant and unfailling water supply is essential. Proximity to post and telegraph offices and a station on a main line is advantageous, and the farm should also be within short train distance of a good-sized town, since railway rates for produce are a heavy item of expenditure. The proximity of a large seaside resort, preferably one which has a winter season, is to be recommended.

But, however favourably a poultry farm is located, the poultry farmer stands a poor chance of success, unless his farm is equipped with up-to-date houses and appliances. This part of the business has been greatly simplified of recent years. Many of the big manufacturers of poultry appliances are practical poultry farmers themselves, and are in a position to advise the beginner, as well as to supply him with everything he needs.

Stocking a poultry farm is a much more complicated business, and no one ought to attempt it who has not been previously well informed, or had opportunities of studying utility poultry at close quarters. The utility breeds of poultry may be roughly divided into three classes: general purpose breeds that combine table with fair laying qualities, laying breeds, and table breeds. In the first named class are Langshans, Orpingtons, Plymouth Rocks, Rhode Island Reds, and Wyandottes; in the second, Leghorns, Minorcas, Andalusians, and Anconas; and in the third, Dorkings, Indian Game; and some of the French varieties or crosses of these with other breeds. The general purpose fowls are the best all-round fowls, as they possess the qualities of both the laying and table classes; they do not lay as many eggs as the laying breeds, but they make better table fowls and are excellent winter layers.

The laying or non-sitting class excels in egg production. These



Poulsters' Company arms

birds are wonderfully prolific, they are hardy and quick growers, and their eggs are large, generally weighing over two ounces. Unfortunately, the greater portion of their eggs are laid during the spring and summer, when eggs are plentiful and cheap. They possess no value as table birds, their flesh being stringy and hard; indeed, it is almost impossible to fatten them. The table class is composed of the breeds most suitable for marketing.

Ducks, although aquatic in habit, will thrive almost anywhere, and ponds are by no means

carry on for at least two years without profit, this period being necessary to establish and consolidate one's position. The total value of eggs and poultry produced in the U.K., 1920, was £65,000,000. *See Fowl.*

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Poultry, THE. London thoroughfare. Linking Cheapside and Mansion House Street, E.C., it is named after the market for poulterers held here in early times. On the N. side, S. of Grocers' Hall, stood a sheriff's prison famous as the Poultry Compter, which had a ward set apart for Jews. The poet Dekker and the Marian martyr, John Bradford, were among its occupants. It was taken down in 1815.



Poultry. The London thoroughfare, looking East

indispensable to their well-being; indeed, the best market produce is said to consist of ducks that have never had a swim. Geese thrive in almost any situation, and so do guinea-fowl, but turkeys require careful handling, as they are very susceptible to climatic conditions. As a general rule they do better on light soils; yet, in a very dry year, when green food is scarce, they may be better reared on a heavy soil, which would ordinarily be impossible. A rich but not heavy soil will generally give good average results in turkey breeding and rearing.

Poultry Farming for Profit

The business side of poultry farming is no less important than the details incidental to raising produce. Given a definite line of production, there is an almost unlimited demand for results. Hence, hand in hand with skilful management and enterprise on the farm, should go the careful study of the best means of disposal when the produce is ready for market. The question of labour has likewise an important bearing upon financial results. The poultry farmer who is prepared to work himself and press his family into his service will naturally effect a saving which in the long run may mean all the difference between profit and loss.

It is generally admitted that no one should embark on poultry farming who is not prepared to

Poultry Chapel, a Congregational building, built on part of its site, was acquired in 1872 by the London Joint Stock Bank for £50,200, which the congregation employed for the building of the City Temple (*q.v.*). Bunyan's Pilgrim's Progress was published from a bookseller's shop in the Poultry, and Tom Hood was born here. The ancient church of S. Mildred's-in-the-Poultry, in which Thomas Tusser was buried about 1580, was burnt in the Great Fire, rebuilt by Wren, and demolished in 1872. Once noted for its hosteleries, as well as for its booksellers' shops, the thoroughfare figures in Dickens's Barnaby Rudge and Beaconsfield's Tancred.

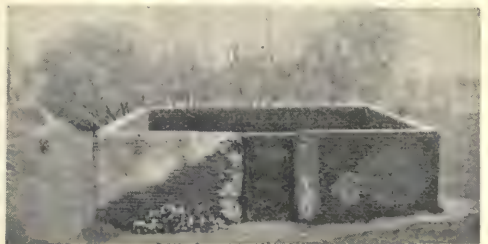
Poultry Club. Ruling body of the British poultry industry. It was founded in 1867, to promote breeding, and to suppress irregularities in connexion with exhibitions, etc., and all important shows, such as those at Birmingham and the Crystal Palace, are held under its rules; it also offers cups, trophies, and medals for competition among breeders and exhibitors. The club quarters are at 3, Ludgate Broadway, London, E.C.4.

Pounce (Fr. *ponce*, pumice). Powder used for rubbing on vellum or parchment where erasures had taken place, so that ink could be employed without it spreading. Pounce consisted of powdered cuttle-fish bone or sandarac. Sand used, until replaced by blotting paper, for drying writing made with ink was also known as pounce.

Pound. Unit of weight. The English unit of weight is the pound avoirdupois of 7,000 grains divided into 16 ounces. It was made the legal unit of weight in 1855, and the standard pound made of platinum is deposited in the Standards office at the board of trade, and authenticated copies are in the mint, Houses of Parliament, etc. The pound troy consists of 5,760 grains, and is the measure used for gold and silver. The contraction lb. for pound comes from the Latin word *libra*. *See Avoirdupois; Grain; Troy Weight.*

Pound. British monetary unit, in full the pound sterling. It was originally a weight of silver, i.e. 5,760 grains of a certain standard of fineness. Such a pound weight of silver was a Roman money standard, and was adopted by the countries they conquered. The silver pound was coined in England into 20 silver shillings. The term gradually came to mean the same as the sovereign. In 1816 the silver standard was abolished, and replaced by a gold one, the gold sovereign or pound sterling becoming the unit. Its weight was fixed at 123.274 grains, and its fineness at 22 carats. *See Sterling.*

Pound (A.S. *pund*, enclosure). Enclosure erected by legal authority, in which cattle distrained for rent, or caught straying and doing damage on land belonging to another than their owner, or straying on the highway, can be confined pending payment of the rent, damages, or penalty and expenses. Pounds are either overt, i.e. open to the sky, or covert, roofed in. Household goods, or other dead chattels, distrained, which are liable to be stolen or damaged by weather, ought to be held in a pound covert, or the distrainer is liable for the



Pound. Enclosure for straying animals on Hampstead Heath, London

consequences. Pound breach, in law, is a misdemeanour consisting in the unauthorised removal of distrained animals or goods from a pound, or in doing damage to the pound itself. The goods, in the case of distress, being from the first in the custody of the law, and not in that of the distrainer, their forcible recovery was regarded as a serious offence. See Distress.

Pounds, CHARLES COURTICE (b. 1862). British actor and singer. Born in London, May 30, 1862, and trained at the Royal Academy of Music, he made his first success as Fairfax in *The Yeomen of the Guard*, at the Savoy Theatre, London, 1888. He appeared in all the Gilbert and Sullivan operas at that theatre until 1892, and afterwards toured in Australia and America. He appeared in *La Poupée*, *Ulysses*, *The Duchess of Dantzio*, and *Chu Chin Chow* (q.v.), in the long run of which, at His Majesty's Theatre, London, Aug. 31, 1916—July 22, 1921, he scored an immense success as Ali Baba.

Pounds, JOHN (1766-1839). British philanthropist. Born at Portsmouth, June 17, 1766, he was apprenticed to a shipwright, but at the age of 15 was crippled through an accident, and became a shoemaker. In 1818 he began to interest



John Pounds, founder of English Ragged Schools

From a statuette by Minton Bros.

himself in the poor children of the town, gratuitously teaching them reading and arithmetic, together with the rudiments of useful knowledge, and thus originating the movement for the institution of



Nicholas Poussin. *The Triumph of Flora*, depicting the goddess in her car, drawn by Cupids, two of whom are crowning her with flowers; one of the artist's most beautiful classical paintings

Louvre, Paris

ragged schools (q.v.). His influence among the poor was very great, and after his death, Jan. 1, 1839, memorial schools were established in several towns.

Poupart's Ligament. Ligament running along the groin from the bony prominence of the pelvis at the side of the lower part of the abdomen to a bony point near the middle line. See *Anatomy*; *Man*.

Poupée, LA. Comic opera, adapted by Arthur Sturges from the French, composed by Edmond Audran, and produced at the Prince of Wales's Theatre, London, Feb. 24, 1897. It had a run of 576 performances. Stella Gastelle appeared in the title rôle, and Courtice Pounds played Lancelot.

Poussin, GASPARD, OR LE GUASPRE (1613-75). French painter, whose real name was Gaspard Dughet. Born at Rome, of French parentage, he studied under his brother-in-law, Nicholas Poussin, who had become a member of the Dughet household, and whose name he adopted. Later he came under the influence of Claude. He excelled in landscapes, particularly those with stormy effects. He died at Rome.

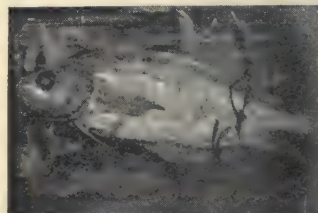
Poussin, NICHOLAS (1594-1665). French painter. Born at Villers, near Les Andelys, Normandy, he studied under Quentin Varin, and at Paris. In 1624 he made his way to Rome, and after a hard struggle obtained the patronage of Cardinal Barberini. Painting historical



Nicholas Poussin, French painter
Self-portrait

pictures and landscapes in the classical style, he rapidly achieved fame, and in 1640 was induced by Richelieu, on behalf of Louis XIII, to come to Paris as the king's painter. In 1643, however, he returned to Rome, ostensibly to fetch his wife, the sister of Gaspard Dughet, and never returned, dying at Rome, Nov. 19, 1665. There are fine specimens of his work in the National Gallery, London, and at Dulwich, and a superb collection in the Louvre.

Pout (*Gadus luscus*). Marine fish of the cod family. Nearly related to the whiting, from which,



Pout. Fish, nearly related to the whiting, found around the W. shores of Europe

however, it differs in the possession of a chin barbel and deeper body, it occurs round the W. shores of Europe, and reaches a weight of 5 lb. It is locally known as the bib and brassy, and is to some extent used for the table. See *Fish*.

Povindah. Class of Afghan merchants engaged in the caravan trade between India and central Asia. Mostly Ghilzai, they migrate each autumn from their Ghazni homes with their families, flocks, and herds, which they leave behind on reaching the British frontier. Thence, disarmed, they carry Bokhara and Samarkand produce through Peshawar all over India.

Powder. Any material in a very fine state of division, as when reduced to dust. Early gunpowder, the first real explosive, was probably dusty, and hence the use of the term powder to designate it, but the substance soon came to be used in large grains and later as prisms, while modern smokeless powders are either granular, in distinct flakes, cords, or tubes. *See* Cordite; Explosives; Gunpowder; Smokeless Powder, etc.

Powell, FREDERICK YORK (1850-1904). British historian. Born in London, Jan. 14, 1850, and educated at Rugby and Christ Church, Oxford, he was called to the bar in 1874 and passed the earlier part of his career as lecturer in law at Christ Church. He wrote one or two historical works, and soon after 1869 began to work with Vigfusson on Scandinavian records, the subject on which his reputation rests, editing and translating two volumes of ancient northern poetry, and with Vigfusson preparing the Records of Iceland. Powell helped to found the English Historical Review, wrote a History of England, and in 1894 was made professor of modern history at Oxford, where he died, May 8, 1904. A Radical in politics and a free-thinker in religion, he combined both with much practical assistance to the poor. *See* Life and Letters, ed. O. Elton, 1906.



F. York Powell,
British historian

Russell

Power (Fr. *pouvoir*, from late Lat. *potere*, to be able). Ability to act, energy, or strength. By analogy it is used as a synonym for a country, e.g. the Great Powers. *See* Nationality.

Power. In English law, an authority conferred by the owner of property upon some other person to deal with that property. Many powers are conferred by statute. Thus, the Conveyancing Act, 1881, confers on mortgagees the power of appointing a receiver of the property when the interest is in arrear, or if the principal is not paid when notice has been given; also the power of making ordinary leases on ordinary terms; also a power of sale when the mortgagor makes default. The Settled Land Acts confer wide powers on the tenant for life, of selling, mortgaging, leasing, exchanging, and otherwise dealing with the property. Speaking generally, when a person who is not the owner of the property

has the right to deal with it wholly or partially as if he were the owner, he does it under a power.

In English law, power of appointment is an authority, given by deed or will, for the donee of the power to dispose of property. Thus, the father of a family may make a will leaving his property in trust for his wife for life, and after her death for such of their children in such shares as she shall appoint. A power to appoint amongst a class, as in the instance given, is called a special power. Sometimes the power is wider, and allows the donee of the power the right to appoint to whomsoever he pleases. It is then called a general power; and under it the donee can appoint to himself if he chooses.

Power of attorney or letters of attorney is the authority given by one person to another to act on his behalf. In all English-speaking countries it is common, when a man is going abroad, for him to execute a formal deed, appointing someone to act as his attorney, or agent, in his absence, to manage his affairs generally, or certain classes of his affairs, e.g. his business. A power of attorney may be very general, or it may contain limitations of the agent's authority.

Power Factor. In electricity, the ratio of the electric power in watts to the apparent power in volt-amperes, in an alternating current circuit or apparatus. *See* Electricity.

Powerful. British protected cruiser. The Powerful and the Terrible were built as replies to the Russian Rurik and Russia. In the South African War the Powerful came into prominence through the work done by her men and guns at Ladysmith, 1899-1900. She was 520 ft. long, 71 ft. in beam, and displaced 14,400 tons. She had engines of 25,000 h.p., giving a speed of 22 knots. As armament she carried two 9-2-inch, twelve

6-inch, and 24 smaller guns, and four torpedo tubes, but was very lightly protected. The Powerful afterwards became Impregnable No. 1, part of the training establishment at Devonport. *See* Battle Cruiser.

Power Plant. Term used for the machinery and buildings which supply power to subsidiary concerns. The term is more commonly used of electrical central power stations, which supply power and light to districts under their control. *See* Electric Power.

Powers, HIRAM (1805-73). American sculptor. Born at Vermont, U.S.A., June 29, 1805, he



Hiram Powers,
American sculptor

studied at Cincinnati, and in 1837 settled at Florence. His masterpiece, The Greek Slave, and other works have been extensively repeated. He executed statues of Washington, Franklin, and Webster, and busts of many other distinguished Americans. His style followed the antique faithfully and rather mechanically. He died June 27, 1873.

Powerscourt. Parish of co. Wicklow, Ireland. It stands on the Dargle, 3 m. from Bray. From it the family of Wingfield takes the title of viscount, a creation of 1743. The viscount's residence, Powerscourt Castle, is a fine granite building standing in a large park and surrounded by magnificent mountain scenery. It contains some pictures of unusual value.

Powis, EARL OF. British title borne since 1804 by the family of Clive, later Herbert. The earls are descended from Robert Clive (q.v.), whose son Edward was created Baron Powis, and in 1804 was raised to the rank of an earl. His son Edward, the 2nd earl, took the name of Herbert instead of Clive, and from him the present earl is descended. He, the 4th earl, lost his eldest son, Percy, Viscount Clive (1892-1916), in the Great War. His estates are mainly in the counties of Shropshire and Montgomery, and his chief residence is Powis Castle, Welshpool. *Pron.* Po-is.



H.M.S. Powerful, the protected cruiser, whose men gained distinction in the South African War

Cribb, Southsea



Powis Castle, Montgomeryshire. The castle and hanging gardens, from across the lower lawn
By courtesy of Country Life, Ltd.

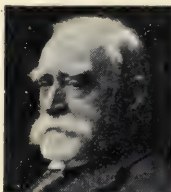
Powis OR **POWYS CASTLE**. Seat of the earl of Powis. It is situated in a fine park, 1 m. from Welshpool, Montgomeryshire. Anciently known as Castell Goch, or Red Castle, being built of red sandstone, it was begun in 1109, dismantled 1293, and has been restored several times. The gateway is flanked by massive round towers. It has been a seat of the Herberts since Elizabethan times. The state bedroom in which Charles II slept is preserved.

Poy. Pseudonym of the British cartoonist, Percy Hutton Fearon. Born in Shanghai, Sept. 6, 1874, he studied art at New York and at Herkomer's school at Bushey. His first cartoons appeared in July, and later he was on the staff of several papers in Manchester. In July, 1913, he joined *The Evening News*, in which he created a number of popular pictorial figures, including John Citizen and Dilly and Dally.

Poynings, Sir Edward (1459-1521). Lord deputy of Ireland and originator of Poynings' Law (*q.v.*). Born in Southwark, a connexion of the Pastons of Norfolk, he supported Buckingham's rebellion in 1483 by heading a rising in Kent, but on the failure of the enterprise, escaped into Brittany, where he joined the forces of Henry, earl of Richmond. With that prince he landed at Milford Haven, Aug. 7, 1485, and was at once made a knight banneret. After distinguished military services on sea and land, against the intrigues of Perkin Warbeck, he was appointed lord deputy of Ireland in 1494. He continued in active military and diplomatic service until his death.

Poynings' Law. Statute passed by the Irish Parliament in 1494, during the period in which Sir Edward Poynings was acting as lord deputy in Ireland for Henry VII. It enacted that no measures might be introduced into the Irish Parliament without the previous sanction of the English king and his privy council; also that all

England in 1854. After studying in Paris at the Beaux Arts and under Gleyre, he settled in London in 1860. In 1869 he was elected A.R.A., becoming R.A. in 1876, and succeeding



Sir Edward Poynter,
British painter
Russell

ing Millais as president in 1896. He was appointed first Slade professor at University College in 1871, and, having been principal previously of the National Art Training College, S. Kensington, became director of the National Gallery in 1894; he resigned this post in 1905. His election as P.R.A. brought him a knighthood, and he became a baronet in 1902. In addition to painting classic genre and portraits in oil and water-colours, he designed mural decorations at S. Kensington, and mosaics at the Houses of Parliament. He resigned the presidency of the R.A., and died July 26, 1919. See Catapult.

Pozarevat, Pozarevac or Pasarewitz. Town of Serbia. It lies S. of the Danube and between the Morava and the Mlava, 12 m. E. of Smederovo (Semendria), and 30 m. S.E. of Belgrade. Because of its strategical importance in relation to the Morava valley, the Serbs turned it into a fortress. Here peace was concluded July 21, 1718, between Austria and Turkey, the former receiving from the latter part of Serbia, including Belgrade, and parts of Rumania and Bulgaria, but these later reverted to Turkey. During the Great War, in the Austro-German invasion of Serbia, the fortress was captured by the Germans, Oct. 14, 1915, after a two days' assault. Pop. 13,000.

Pozières. Village of France, in the dept. of Somme. It stood 4½ m. E. of Albert, on rising ground which gave the Germans valuable

existing English laws should be deemed to be in force in Ireland. Poynings' Law was not repealed until 1782. See Ireland.

Poynter, Sir Edward John (1836-1919). British painter. Born in Paris, March 20, 1836, son of Ambrose Poynter, architect, he began to follow art in

observation in the Somme battle area. It was stormed by the British 48th and 1st Australian divisions, July 23-25, 1916, the Anzacs rushing it on the latter date. Lost in the spring of 1918, its ruins were recovered by the British, Aug. 24, 1918. The windmill, nearly a mile to the N.E., was also the scene of fighting in July-Aug., 1916. A cross erected on the ruins of the village commemorates the Australians who fell in its capture, 1916, and an official British memorial is to be erected. See Somme, Battles of the.

Poznań. County of Poland. Formerly known as Prussian or German Poland, it comprised the Prussian province of Posen. It adjoins Germany on the W. and consists of the W. portion of the Polish plains, here drained by the Warta and Netze, which belong to the river system of the Oder. Sandy wastes alternate with fertile stretches of loess; pine forests cover extensive areas; rye, wheat, barley, and sugar-beet are cultivated. Spirits, sugar, bricks, and timber goods are the chief manufactures. Its area is 11,190 sq. m. Pop. 2,100,000. See Posen.

Pozoblanco. Town of Spain. In the prov. of Córdoba, it is 32 m. from Córdoba. It has manufactures of woollens and leather, and a trade in agricultural produce, while famous fairs are held here. Zinc and silver lead are mined in the vicinity. Pop. 13,000.

Pozsony. Magyar official name for the city on the middle Danube, formerly in Hungary, now in Czecho-Slovakia (Bratislava), commonly known as Pressburg (*q.v.*).

Pozzo di Borgo, Carlo Andrea, Count (1764-1842). Russian statesman. Born near Ajaccio,



Count Pozzo di Borgo,
Russian statesman
After Hayter

March 8, 1764, he became a lawyer and in 1792 was a delegate to the national assembly in Paris. Coadjutor with Paoli in the government of Corsica, 1792-96, he fled to London on Paoli's fall, and in 1798 went to Vienna, where he mingled in politics and exercised all his power to thwart Napoleon. Entering the Russian diplomatic service in 1804, he helped to conclude the alliance with Austria, but the Franco-Russian treaty of Tilsit caused his retirement to Vienna, whence, hounded by Napoleon, he took refuge in London, remaining there until recalled to Russia in

1812. Persuading Murat to abandon Napoleon, he was active in the congresses of Frankfort, Vienna, and Aix-la-Chapelle, and was Russian ambassador in Paris, 1814-35. Transferred to London in 1835, he retired in 1839, and died in Paris, Feb. 15, 1842.

Pozzuoli (Gr. *Dicaearchia*; Lat. *Puteoli*). Seaport of Italy, in the prov. of Naples. It stands on a promontory in the Gulf of Pozzuoli, itself an inlet of the Bay of Naples, 8 m. by rly. W. of Naples. It was a commercial centre, and the surrounding districts were crowded with the residences of wealthy Romans. Its mineral baths, used



Pozzuoli, Italy. Ruins of the Serapeum. Top, right, the sea front and fishing harbour

by the Romans, are still frequented. In the vicinity are temples, tombs, baths, cisterns, the Serapeum or Temple of Serapis, and an amphitheatre where Nero presided at gladiatorial combats, and where S. Januarius was thrown to the lions. From the local volcanic earth is made the famous "pozzolana" cement. Puteoli, founded by Greeks as Dicaearchia about 520 B.C., was colonised by Rome in 194 B.C., and became an important trade centre under the emperors. It was destroyed by Huns and Saracens, and has many times suffered from earthquakes. Pop. 23,000.

P.P.C. Abbrev. of the French words *pour prendre congé*, to take leave, to pay a parting call.

P.R.A. Abbrev. for President of the Royal Academy (London).

Pradier, JAMES (1792-1852). Swiss sculptor. Born at Geneva, of French parents, May 23, 1792, he studied under Lemot and Gérard in Paris. He won the Prix de Rome in 1813, and became a professor at the Beaux Arts, 1827. A follower of the tradition of

de Gallego, Saragossa, he studied at the Madrid Academy, then at the

David, he produced much ideal and portrait sculpture of a coldly severe classical type. He died at Bougival, near Paris, June 14, 1852.

Pradilla, FRANCISCO (1847-1921). Spanish painter. Born at Villanueva



Prado. The famous art gallery at Madrid; on the left is the church of S. Jerónimo el Real

Spanish Academy, Rome, of which he afterwards became director. A painter of history and genre, his work achieves strength and distinction. One may cite his *Doña Juana La Loca*, the mother of Charles V, given a medal at the Paris Exposition of 1878. He died in 1921.

Prado. Short name for the great art gallery at Madrid, the Real Museo de Pintura del Prado. It is the most important of Spanish art collections, rich in the finest works of Titian, Velazquez, and Goya, while the art of Rubens, Van Dyck, Raphael, Correggio, Giorgione, and El Greco is adequately represented. The Spanish school is represented from first to last, and there is a fine collection of Flemish paintings. See Madrid.

Praeipce (Lat., command). Old English law term. It is still in

common use as denoting the slip of paper on which the plaintiff writes the particulars of the writ that he wishes to issue from the court. It also denotes the particulars of the writ, judgement, etc., filed by an execution creditor in order to obtain a writ of execution. It used to begin "Praeipce A.B. quod, etc.";

hence the name. *Pron.* pree-sip-e.

Praed, WINTHROP MACKWORTH (1802-39). British poet. He was born in London, July 26, 1802, and educated at Eton, where he helped to found the school magazine *The Etonian*, and at Trinity College, Cambridge, of which he became a fellow in 1827. Called



James Pradier, Swiss sculptor



Francisco Pradilla, Spanish painter



W. Mackworth Praed, British poet
After A. Mayer

to the bar in 1829, he entered Parliament as Conservative member for St. Germans. Afterwards he represented Great Yarmouth, 1835-37, and Aylesbury from 1837 until his death from consumption, July 15, 1839. Praed's genius was for light verse, in which he gave full play to his brilliant wit. Among his more serious efforts is the *Red Fisherman*, a poem of considerable imaginative power. An authorised edition of his poems, with a memoir by Derwent Coleridge, appeared in 1864. *Pron.* Praed.

Praefect (Lat. *praefectus*, set over). Title held by various officials appointed by superior authority, not chosen by the people, in the Roman constitution. Under the kings the *praefectus urbi* was deputy governor of the city for the king during his absence, and under the republic was appointed by the consul who last left the city; under the empire the title was revived for an official with extensive police powers and jurisdiction.

Military praefects were the commander of the imperial bodyguard, camp praefects, of whom each legion had one, the commander of the engineers, and for the navy fleet praefects, as distinct from ship commanders. An important official in imperial times was the praefect of Egypt, first appointed by Augustus. *See* Prefect.

Praemunire, STATUTES OF. In English history, name given to certain statutes originally directed against the power of the papacy in England. The name is corrupted from the opening words (*Praemonere fucias*, cause to be forewarned) of writs against offences of contempt against the crown, and attempts to encroach on the powers of the crown. The first statute, though not so called, of the nature of Praemunire was that of Edward I, 1306, laying down that no tax imposed by religious authority should be sent out of the realm.

The statute of Edward III, 1353, was directed against the papacy, and forbade that matters falling within the jurisdiction of the king's courts should be taken before any foreign court. The most important statute of Praemunire is that of Richard II, 1392, which imposed the penalty of forfeiture on those who should bring into the kingdom any papal bulls, rescripts, etc., without the king's sanction. Later, Praemunire was directed against several miscellaneous offences, e.g. the assertion that Parliament could act independently of the sovereign, 1661. *See* Wolsey.

Praeneste. Ancient city of Latium, now represented by Palestrina (q.v.). It lay about 22 m.

E. of Rome, on the borders of the country of the Aequi, and was traditionally believed to have been founded by Caeculus, son of Vulcan, its original name being Stephanē. Built at the foot of a commanding hill crowned by a fortress, it had considerable strategic importance. It sided with the Latin League against Rome, but was overcome by Camillus, 380 B.C. Captured from Marius by Sulla's lieutenant, Lucretius Ofella, 82 B.C., its territory was divided among the victor's soldiery, and it later became a favourite resort.

The superb Temple of Fortune, built on the terraced hill, stood where the modern town stands, and was famed for its oracle. Claudius Aelianus, the 3rd century writer on natural history, was born here. Among archaeological discoveries of importance have been, in 1773, the Roman calendar, known as the *Fasti Praenestini*, and, in 1886, the *Fibula Praenestina*, a gold brooch inscribed with early Latin of probably the 6th century B.C. *See* Phoenicia.

Praesepe (Lat., a manger). In astronomy, a star cluster in the constellation of Cancer. To the naked eye it appears as a misty patch of light, and from its shape is popularly known as the beehive. In the telescope it is resolved into a number of stars. *Pron.* preeseepy.

Praesodymium. One of the rare metallic elements. Its chemical symbol is Pr; atomic weight, 144.3; specific gravity, 6.475; melting point, 940° C. (1,724° F.). It is obtained from certain rare earths by electrolysis of the fused chloride. *See* Neodymium.

Praetor. Second in dignity among the magistrates of the Roman republic, the consuls being first. The duties of the *praetor urbanus* were chiefly legal. He had jurisdiction in all civil cases among Roman citizens. On entering his year of office he published an edict setting forth the principles which were to regulate his decisions. These edicts were the foundation of the Roman civil law. There were also *praetores militares* charged with the administration of provinces. The praetors were preceded by lictors. *See* Imperium; Lictor.

Praetorian Guard. Household troops of the Roman Empire. In the time of Augustus they comprised nine cohorts of 1,000 men each. The Praetorians played a prominent part in the many revolutions which made and unmade emperors. *See* Rome.

Pragmatic Sanction (Gr. *pragma*, act, business). Term used in Roman law and afterwards in European politics for a decision

dealing with a public matter affecting the state as a whole.

The best known is the one by which the emperor Charles VI, being without sons, attempted to secure his lands for his daughter Maria Theresa. First put forward in 1713, it was accepted by the diets of his Austrian lands and nearly all the sovereigns of Europe, but when he died it was forgotten, and the War of the Austrian Succession was the result. Other Pragmatic Sanctions include one issued by Charles VII of France in 1438, ordering the reform of the Gallican Church, and one issued by the emperor Charles V in 1547. *See* Frederick II.

Pragmatism. Philosophical term of American origin, the idea of which was due to C. S. Pierce, and the first use of the word to William James. It signifies an empiricism which considers the practical value, the consequences and bearing upon human interests of an assertion or conception, to be the criterion of its truth. *See* Bergsen, H.; Empiricism; James, W.; Philosophy.

Prague (Ger. *Prag*; Czech. *Praha*). Capital of the republic of Czecho-Slovakia, in Bohemia.



Prague arms

above the city is the Hradčany, the castle of the former kings of Bohemia. The old town on the



Praetorian Guard, from a bas relief
Louvre, Paris

right bank contains the Grosser Ring, the chief square, where are the fine town hall, the Kinsky Palace with its excellent library, and the old Hussite church, the Týn Church.

The Cathedral, begun in 1344, occupies the site of a building erected by S. Wenceslaus in 935. The Clementinum is a block of baroque erections due to the Jesuits, 1653-1726, comprising



Prague. Plan of the Bohemian city, capital of the republic of Czechoslovakia churches, chapels, gateways, and towers. There are two universities.

The site has naturally become a nodal point for the rlys. of Bohemia, while the lower Moldau and the Elbe give routes for river traffic to Hamburg. Breweries, textile factories, iron-foundries, and machine shops are the principal industrial establishments. Pop. 224,000. See Clock; Moldau.

Prague, BATTLE OF. Victory of Frederick the Great in the Seven Years' War, May 6, 1757. Frederick

began the campaign of 1757 by marching on Prague, which was held by Charles of Lorraine with some 75,000 Austrians. Attacking the Austrians on their left flank, Frederick ordered a general advance. The battle, which was fiercely contested, was going against Frederick, who had lost heavily, when a desperate cavalry charge against the Austrians' wings broke their defence and put them to flight. They retreated into Prague, having lost over 10,000

men and 4,300 prisoners. The Prussian losses were even heavier, but they held the field and laid siege to the city.

Prah OR PRA. River of West Africa, in the Gold Coast Colony. It rises E. of Bompata, flows S.E. on the boundary between Ashanti and the Gold Coast Provinces, and then S. to the Atlantic Ocean.

Prahran. Suburb of Melbourne, Australia. It has a rly. junction on the suburban lines which serve the S.E. of the city.

Prai OR KUALA PAI. Seaport town of Province Wellesley, one of the Straits Settlements. It stands on the channel separating the mainland from the island of Penang opposite George Town.

Prain, Sir DAVID (b. 1857). British botanist. Born July 11, 1857, he was educated at schools at Fettercairn

and Aberdeen, and at Aberdeen and Edinburgh Universities. Having studied medicine, he became demonstrator of anatomy at the college of surgeons, Edinburgh, in 1882, and to the university in Aberdeen in 1883. In 1884 he entered the Indian Medical Service. From 1895-1905 he was professor of botany at the medical college at Calcutta, and in 1898-1905 director of the botanical survey of India. In 1905 Prain was appointed director of the botanic gardens at Kew. In 1912 he was knighted.



Sir David Prain,
British botanist
Russell



Prague, Czechoslovakia. 1. The Charles Bridge across the Moldau, looking towards Hradčany. On the hill is seen the cathedral with the Royal Palace on its left; on the right the Lobkowitz Palace. 2. The Tyn Church, the old Hussite centre. 3. Old Town Bridge Tower and the Charles Bridge. 4. Cathedral of S. Vitus, from the east

Prairial. Ninth month in the year as rearranged during the French Revolution. It began on the 20th or 21st of May. The word means the month of meadows.

Prairie (Fr. from Lat. *pratum*, meadow). Temperate natural grassland of the central plains of N. America. In the E. portions, especially in Manitoba and the Red River Valley, enormous quantities of cereals are grown, but in the drier belt nearer the Rockies stock-rearing is more important. See Pasture; Steppe.

Prairie Dog or **PRAIRIE MARMOT** (*Cynomys ludovicianus*). Rodent found in N. America and allied



Prairie Dog. N. American burrowing rodent, allied to the squirrel

W. S. Berridge, F.Z.S.

to the squirrels. There are three or four other species, all of which live in burrows in the open plains, usually in very extensive colonies. They are about a foot long, and the fur is brown and yellowish white beneath. They feed mainly on grass and roots, and construct mounds before their homes, which they use as watch-towers. Many of the burrows are also tenanted by the burrowing owl.

Prairie Hen (*Tympanuchus americanus*). Bird allied to the grouse, native of N. America from the valley of the Mississippi to Ontario. About 19 ins. long, it is brown above, streaked transversely with black and buff; the underside pale brown, with the transverse marks white. The head bears a small white-tipped crest. On each side of



Prairie Hen of North America; cock bird of the species

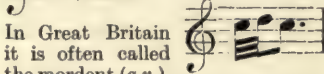
the neck of the male is an inflatable orange sac, covered by a tuft of stiff black feathers. During the breeding season males to the number of 40 or 50 assemble at daybreak in their so-called "scratching places," and go through a performance of display in which low tooting and booming sounds are produced by means of the distended air-sacs, as well as cackling and screams of defiance. These meetings, which last only till sunrise, end in fierce battles. They feed on buds, berries, acorns of the scrub oak, and seeds. As food the flesh of the prairie hen is esteemed.

Prakrit (Skt., natural, common). General name for the popular languages of India as opposed to the classical Sanskrit (=perfected), of which they are the direct descendants. Until about A.D. 1000 the Prakrits were divided into four chief dialects: Magadhi (Bihar), Ardha-Magadhi (half-Magadhi, Benares), Apabhramsa (=decadent, valley of the Indus), Saurasēni (between the Ganges and the Jumna). These four dialects, which are the source of all the modern vernaculars of India, are related to the ancient Sanskrit as the Romance languages to Latin. The chief source for the knowledge of early Prakrit is the Indian dramas, in which it is used by characters of lower rank. See India.

Pralltriller (Ger.). Musical ornament indicated thus:



and performed as shown below:



In Great Britain it is often called the mordent (*q.v.*), which, however, should be played with the lower auxiliary note.

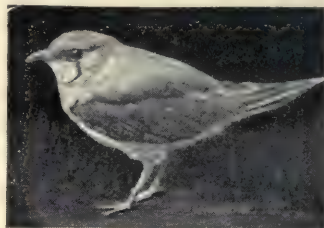
Prat, ARTURO (1836-79). Chilean sailor. He is known as the commander of the Esmeralda, which was sunk at Iquique by the Peruvian ironclad Huascar. In this engagement, which took place April 26, 1879, Prat lost his life. See Chile-Peruvian War.

Prati, GIOVANNI (1815-84). Italian poet. Born near Trent in Italian Tirol, he studied law at Padua. He won prompt recognition by his blank verse narrative poem, *Ermenegarda*, 1841, and in subsequent years his lyrics embodied much of the national spirit. He was a member of the Italian parliament, first as deputy and then as senator, from 1862 until his death in Rome, May 9, 1884.

Pratinas. One of the early Greek tragedians. A native of Phlius, in Peloponnesus, not far from Corinth, he was the contem-

porary of Aeschylus, against whom he competed for the prize at the Dionysia. He is said to have been the first to compose satyric dramas, the only complete extant example of which is the *Cyclops* of Euripides. The collapse of the wooden seats of the spectators during the performance of one of his plays is said to have been directly responsible for the erection of stone theatres.

Pratincole (*Glareola*). Genus of birds. They are allied to the sandpipers, but distinguished by their



Pratincole. Collared pratincole, an occasional visitor to Great Britain

short, curved bill, with wide gape, long, pointed wings, and forked tail. There are 10 species, small, slender birds that run like plovers and fly like swallows. The best known species is the collared pratincole (*G. pratincola*) of S. Europe, W. Asia, and N. Africa, whence it migrates to India and S. Africa, and occasionally visits Britain. It is brown above, with black and white wings and tail, the breast yellow-brown, and the underparts white with blackish legs. There is a broad patch of dull buff on the throat, outlined with black. They frequent sand-banks and coastal lands, feeding upon insects, caught mostly on the wing. Their note is harsh and shrill. See Bird.

Pratique (Fr., intercourse). Certificate given to a ship that has complied with the quarantine regulations, permitting her to land passengers or crew. It also means: release from quarantine (*q.v.*).

Prato. City of Italy, in the prov. of Florence. It stands on the Bisenzio, an affluent of the Arno, 11 m. by rly. N.W. of Florence, and is encompassed by 11th and 14th century walls. The stately marble cathedral, begun in the 12th and finished in the 15th century, has a beautiful external pulpit (see Pulpit), from which the Virgin's Girdle is displayed to the faithful; also frescoes and pictures, and bas-reliefs by Della Robbia, who executed medallions for the 15th century early Renaissance Carceri church. There are works by the two Lippis, Agnolo Gaddi, Giovanni Pisano, and other Florentine artists. The chief manufactures

are straw, cotton, and silken goods, macaroni, furniture, etc. There are serpentine quarries in the neighbourhood. It was a republic in the Middle Ages. Pop. 50,000.

Pratz, CLAUDE DE. Anglo-French novelist and journalist. She was born in London, of French parentage, and educated in London and Paris. Having joined the staff of *The Fronde*, a Parisian journal written and managed by women only, she became also a contributor to many of the leading London papers. She was made professor of English language and literature at the Lycée Racine in Paris, and was later appointed general inspector of public charities under the ministry of the interior. Her novels, written in English, include *Eve Norris*, 1907; *Elizabeth Davenay*, 1909; and *Pomm's Daughter*, 1914. She also wrote *France from Within*, 1912; and *A Frenchwoman's Notes on the War*, 1916.

Prawn (*Leander serratus*). Stalk-eyed crustacean of the family Palaemonidae. It is common on the British coasts, particularly where there are submerged rocks in shallow water. About four inches in length, the animal is clad in a translucent, jointed shell of greenish grey, which turns red when the prawn is cooked. The carapace, which covers the combined head and thorax, is extended forwards in a long sword-like rostrum, strongly toothed on its upper and lower edges. There are two pairs of antennae, the inner pair each bearing three long lashes, and the outer pair each with a single lash extending back far beyond the broad tail fan. The first two pairs of legs are armed with pincers.

The prawn swims through the water by means of the six pairs of swimming feet (pleopods) under the hind body; and can dart back suddenly out of danger by spreading the tail and flexing the hind body. It feeds upon the small green seaweeds and the entomosomes.



Prawn. Crustacean common in the shallow waters of the British coast

traca that frequent them. Prawns are caught in a small ring-net and in wicker traps of similar formation to lobster-pots. See Crustacea.

Praxiteles (fl. 360-340 B.C.). Greek sculptor. He worked at Athens, which was probably his



Prato, Italy. Façade and campanile of the cathedral, showing the 15th century outdoor pulpit

birthplace. The only authentic work by him known to exist is the group of *Hermes and Dionysus*, which was discovered 1877, with the base and signature intact, among the ruins of the temple of *Hera at Olympia*; this is now in the local museum. There are, however, numerous copies of his



Prawn. Setting a prawning net in a rock pool

Aphrodite of Cos and *Aphrodite of Cnidus*, *Sleeping Satyr*, *Apollo the Python-slayer*, and other famous statues. He chose beautiful types, but did not idealise unduly; thus his fairest goddesses are mortal rather than divine. See *Hermes*. Pron. Praxitel-eez.

Prayer. Term used to denote a request made by an inferior to his superior, and more particularly a request made by man to the supernatural being or beings who form the object of his worship. Prayer in some shape or form is characteristic of every type of religion, from the lowest to the highest. Sometimes it is associated with the use of spells and charms. In Buddhism, for instance, prayer-cylinders are used inscribed with a sacred formula, and, by causing these cylinders to revolve, the worshippers are supposed to be able to secure their desires, accu-

mulate merit, and place themselves under the special protection of the deities who form their objects of reverence. In the lower forms of religion prayer is almost always associated with magical and superstitious practices.

Prayer may therefore be regarded as one of the most primitive and natural instincts of the human soul. Prayer and reli-

gion have always been regarded as inextricably bound up together.

Criticism in modern times has raised two serious objections to prayer. (1) The first is theological. It is urged that God is immutable, and moreover does not need to be told what man needs. The usual answer given to this is: The ability of God to give is conditioned always by the ability of man to receive. Prayer increases the ability to receive, because it induces an attitude of receptivity in the soul, and consequently makes it possible for God to meet the needs of the intercessor. (2) The second is based on scientific grounds. The universe is ruled and governed by immutable laws, which admit of no infraction or interference from without. An answer to prayer would violate the law of uniformity, and so is impossible. The reply to the objection is obvious. Man, by the use of his scientific knowledge, can use and manipulate the laws of nature for his own purposes without in any way violating the law of uniformity, and the power of God cannot be less than the power of man. See *Lord's Prayer*.

Prayer Beads or *CRABS'-EYES* (*Abrus precatorius*). Climbing plant of the natural order Legu-



Prayer Beads. Foliage and flowers; inset, seeds

minosae, native of India. The leaf is divided into two rows of narrow oblong leaflets, and the pea-like, pale purple flowers are in clusters. The oblong pods contain from four to six bright scarlet polished seeds, with a black patch around the scar marking their attachment to the pod. Buddhists thread them to make rosaries, and they are also made into necklaces. They are employed in India as a standard of weight.

Prayer Book. Authorised service book of the Church of England. Other churches in communion with it, such as the Church of Ireland, the Episcopal Church of Scotland, and the American Church, have service books which differ from the Anglican Prayer Book in some important details.

The Book of Common Prayer is in one sense a product of the Reformation, since it originated from the demand that the public worship of the Church should be in the vernacular; but in another sense it is a product of earlier times, since the materials from which it is compiled are the services of the medieval Church, which themselves developed from the rites of the early Christian centuries. Besides the medieval service books some influence must be attributed to Reformation orders of public worship, in particular to the so-called Consultation of Archbishop Herrmann (1543).

The first authorised service in English was the Litany, translated and adopted by Archbishop Cranmer. During the same reign portions of the Mass were also read in English. In the reign of Edward VI the Prayer Book first appears as a complete order of public worship in the English language. The chief author of it was Cranmer, though he had the assistance of several other bishops. It was, almost certainly, approved by Convocation, and was enforced by Parliament in the first Act of Uniformity, 1549. The first Prayer Book did not go far enough in the direction of innovation to satisfy the more extreme reformers, such as Ridley and Hooper, and in 1552 the second Prayer Book was authorised, which went a long way to meet their demands, and represents the nearest approach made by the Church of England to assimilation with the services of the reformed churches of the Continent.

The accession of Elizabeth saw another revision of the Prayer Book, 1559, which was on the whole a return towards the position of the first Prayer Book. Under Elizabeth the Prayer Book assumed substantially the form

which it still retains, and subsequent alterations have been of minor importance. During the Commonwealth the use of the Prayer Book, whether in public or private, was prohibited, but at the Restoration it became once more the service book of the nation, and in 1661 underwent its last revision. Since that date no changes have been made, except that in 1871 a new list of lessons was adopted. In 1907 royal letters were addressed to the Convocations of Canterbury and York, instructing them to inquire into the advisability of another revision. In 1923 certain minor changes were adopted. See Church of England; consult also Annotated Book of Common Prayer, J. H. Blunt, 1892; The Workmanship of the Prayer Book, J. Dowden, 1899; A New History of the Book of Common Prayer, F. Proctor and W. H. Frere, 3rd ed. 1905; The Prayer Book: What it is, 1907, 3rd ed. 1911, and The Art of Public Worship, 1919, P. Dearmer; The Prayer Book Dictionary, ed. George Harford, Morley Stevenson, and J. W. Tyrer, 1913.

Praying Mat OR CARPET. Article used by Mahomedans for kneeling upon when at prayer. About the size of a wide hearthrug, and known as a *seggideh*, it is marked with a nick, the point of which is turned towards Mecca. See Liberia.

Praying-Wheel. Symbolical instrument used by Buddhists of Tibet in religious exercises. It consists of a cylinder, around which are wound paper bands inscribed with repetitions of the sacred



Praying-Wheel of Hindu silver ware, Tibetan type

is so thin, and so closely printed are the symbols, that a praying-wheel 8 ft. in height may contain many more than a million repetitions of the mantra. Prayer flags, printed strips of buttermilk fastened to poles from 20 to 30 ft. in height, are also used. See Lamaism; consult also The Buddhist Praying-Wheel, W. Simpson, 1896; Lhasa, P. Landon, 1906.

Preaching (Lat. *praedicare*, to proclaim). Public oral appeal on behalf of a religious belief, i.e. the delivery of a sermon. It is intended to convert, or at least exhort, occupies an important place in the history of Christianity, and is practised in other religions. A sermon was formerly called a homily, hence the term homiletics (*q.v.*).

The disciples of Jesus Christ, notably S. Paul, preached a great deal, as did some of the fathers of the Church. Chrysostom was a great preacher, and in the early centuries of the Christian era there were a number of men who combined religious fervour with intellectual distinction and oratorical power. The next group of great preachers were the missionaries who, from the monasteries of Ireland and Scotland, carried the Christian faith over Europe. The Reformation gave an added importance to preaching, and Luther, Knox, Latimer, and their contemporaries realized the value of an impassioned personal appeal. Hitherto, preaching had not been a regular part of the services of the Church, but Protestants, especially Nonconformists, soon made the sermon an integral part of divine worship. They, too, stereotyped the plan of basing it on a text taken from the Bible. After the excitement of the Reformation, preaching took a more intellectual tone, marked by the names of Bossuet, Massillon, Jeremy Taylor, South, and others.

Preaching was a feature of the religious revival of the 18th century, as of all religious revivals, Wesley and Whitefield being among the best known of many popular preachers. In the 19th century Spurgeon exercised a remarkable sway by his preaching, while Robertson and Liddon, with their more intellectual appeal, were equally though less apparently successful. Of many other great 19th century preachers may be mentioned Newman, Phillips Brooks, and Lacordaire. Preaching has been most obviously effective when addressed to an unlettered audience at a time of religious unrest.

The first requisite of the preacher is an intense belief in the truth of

what he says. This accounts for the success which has attended the preaching of unlettered men. Hardly less important is a knowledge of human nature, an ability to adapt the appeal to the mood of the audience. A good voice, managed with skill and discretion, is essential, while some knowledge of oratory is desirable. The greatest preachers have often been great students, firstly of the Bible, and secondly of other branches of Christian literature. *See* Pulpit; Sermon; consult also Mediaeval Preachers and Preaching, J. M. Neale, 1857; A History of Preaching, E. C. Durgan, 1906.

Pre-Adamites. People formerly supposed to have inhabited the world before Adam. Some people hold that Adam was the first man of a new creation to take the place of an earlier people who had been exterminated. This view was advocated by Isaac de la Peyrère (1592-1676), and his followers were sometimes called Pre-Adamites.

Preamble (Lat. *praeambulare*, to walk before). Literally, an introductory statement. It is chiefly used in connexion with Acts of Parliament, which usually open with a paragraph detailing the objects sought in passing the Act. An example is the preamble to the Parliament Act of 1911, stating that its authors intended to reform the House of Lords.

Prebend (late Lat. *praebenda*, soldier's rations). Eccles. term for the food, clothing, etc., provided for a clergyman or monk, as distinct from the income of a benefice. Later it came to be used for an endowment provided for the support of a priest attached to the staff of a cathedral; the holder of the prebend being known as a prebendary. The office of prebendary is now usually a sinecure conferred on a clergyman as a mark of distinction, and the income attached to the dignity is nominal or nil.

Pre-Cambrian. In geology, name given to the period older than the Cambrian. It is one of great indefiniteness in many ways, and no general classification of it has been accepted by geologists. The term is usually applied to include all those rocks which are of a greater age than those containing the Olenellus fauna of the Cambrian. The rocks are the oldest on the earth, dating from the first formation of a solid crust on the earth's surface down to Cambrian times, and comprise conglomerates, sandstones, greywacke, gneisses, slates, limestones, quartzites, etc. They are usually highly metamorphosed igneous and sedimentary

strata which contain few fossils. They are rich in iron and other minerals, as graphite, talc, gold, copper, nickel, etc., and contain many valuable building stones, in particular granite and marble.

Pre-Cambrian rocks are found widely scattered and often receive local names, or are sub-divided.

Precedence (Lat. *praecedere*, to go before). Order in which individuals follow each other at state and other ceremonies. It begins with the sovereign or ruler and his family, and is most exactly enforced in monarchical countries. Precedence is determined either by birth or by office. In England the order rests on ancient usage and subsequent regulations as, for instance, the one which ranked the prime minister after the archbishop of York. The first of various statutes was passed in 1539, and the regulations, which are based on letters patent, are issued by the lord chamberlain, assisted by the Herald's College. In Scotland the authority rests with the Lyon court; in Ireland with the Ulster king of arms. As regards local authorities in the United Kingdom, no written code has been promulgated, but in the county the lord-lieutenant stands first, followed by the high sheriff.

ORDER OF PRECEDENCE IN THE UNITED KINGDOM.

The Sovereign. The Prince of Wales. Sons of the Sovereign. Grandsons of the Sovereign. Sovereign's Brothers. Sovereign's Uncles. Sovereign's Nephews. Archbishop of Canterbury. Lord High Chancellor. Archbishop of York. Prime Minister. Lord Chancellor of Ireland. Lord President of the Privy Council. Speaker of the House of Commons. Lord Privy Seal (if of Baronial rank). Seven following state officers if Dukes: (1) Lord Great Chamberlain (or duty). (2) Lord High Constable. (3) Earl Marshal. (4) Lord High Admiral. (5) Lord Steward. (6) Lord Chamberlain. (7) The Master of the Horse. Dukes according to their Patent of Creation: 1. Of England; 2. Of Scotland; 3. of Great Britain; 4. Of Ireland; 5. Those created since the Union. Eldest sons of Dukes of Blood Royal. Seven above state officers if Marquesses. Marquesses, in same order as Dukes. Dukes' eldest Sons. Seven above state officers if Earls. Earls, in same order as Dukes. Younger sons of Dukes of Blood Royal. Marquesses' eldest Sons. Dukes' younger Sons. Seven above state officers if Viscounts. Viscounts, in same order as Dukes. Earls' eldest Sons. Marquesses' younger Sons. Bishops of London, Durham, and Winchester. All other English Bishops, according to their seniority of consecration. Seven above state officers if Barons. Secretaries of state, and Chief Secretary to the Lord Lieutenant of Ireland if of the degree of a Baron. Barons, in same order as Dukes, Commissioners of the Great Seal. Treasurer of H.M.'s Household. Comptroller of H.M.'s Household. Vice-Chamberlain of Household. Secretaries of state and Chief Secretary to the Lord Lieutenant of Ireland under the degree of Baron. Viscounts' eldest Sons. Earls' younger Sons. Barons' eldest Sons. Knights of the Garter if commoners. Knights of St. Patrick. Privy Counsellors if of no higher rank. Chancellor of the Exchequer. Chancellor of the Duchy of Lancaster. Lord Chief Justice of England. Master of the Rolls. The Lords Justices of Appeal and President of the Probate, Divorce and Admiralty Courts. Judges of the High Court. Viscounts' younger Sons. Barons' younger Sons. Sons of Life Peers. Baronets of either Kingdom, according to date of Patent. Members of the various Orders

in following rotation: G.C.B., G.C.S.I., G.O.M.G., G.C.I.E., G.C.V.O., G.B.E., K.C.B., K.C.S.I., K.C.M.G., K.C.I.E., K.C.V.O., K.B.E. Knights Bachelor. Judges of County Courts and Judges of the City of London Court. Sergeants-at-Law. Masters in Lunacy. C.B., C.S.I., C.M.G., C.I.E., C.V.O., C.B.E., D.S.O. Members of the 4th Class of the R.V.O. Officers of the British Empire. Companions of the I.S.O. Eldest Sons of younger Sons of Peers. Baronets' eldest Sons. Eldest Sons of Knights of the Garter. Eldest Sons of Knights in order of the fathers. Members of the 5th Class R.V.O. Members of the British Empire. Younger Sons of the younger Sons of Peers. Baronets' younger Sons. Younger Sons of Knights in the same order as their Fathers. Naval, Military, and other Esquires by Office.

Precedent. In general, an action or rule which is used as an authoritative example to be followed in similar circumstances at a later time. In law, precedent plays an important part. In order that the course of law may be as certain and regular as possible, the practice has grown up of recording the decisions of judges, particularly on new points, so that these judgements may serve as precedents for future cases of similar nature. A judge of first instance is not, strictly speaking, bound to follow the decisions of another judge of equal rank, but he is bound to follow the judgements of a superior court, and a court of appeal is always bound to follow its own judgements.

The common law of England is to be found almost entirely in the decisions of judges who have expounded the principles whereon it is based. The same observation applies to equity as administered in England. In Scotland also the common law is built upon precedent. *See* Justice; Law.

Precentor (late Lat. *praecinere*, to sing before). Leader of the singers in the rendering of the musical portion of the service in a cathedral. The term first appeared in the 4th century, when in chanting it became usual for the first half of each verse of the Psalms to be sung by a precentor or precentors, and for the choir and people to take up the latter half. SS. Basil, Athanasius, and Chrysostom all allude to the custom, and the Apostolic Constitutions order it. In cathedral churches of the Church of England, the precentor is usually the chief of the minor canons, and is responsible for all the musical arrangements of the services. The word was specially used of the leader of praise in Scottish churches before the introduction of organs.

Precept (Lat. *praecipere*, to ordain). Literally a rule or law or order. It is used specially in England for the written warrant of a magistrate. An order from a local authority, e.g. board of guardians, for the payment of money to it from the rates is known as a precept. *See* Rate.

Preceptor. Literally, one who issues orders, especially by way of instruction, therefore, a teacher. The Knights Templars called their provincial houses, or divisions, preceptors, and the head thereof the preceptor.

Preceptors, COLLEGE OF. British educational institution. It was established 1846 and incorporated in 1849, and its membership is chiefly among the proprietors of private schools. Its original aim was to raise the standard of teaching by granting diplomas to teachers; afterwards examinations for pupils were instituted. Its diplomas are F.C.P., L.C.P., and A.C.P., i.e. fellow, licentiate, and associate of the college, and it also grants a certificate of ability to teach. It has a paper, *The Educational Times*. Its headquarters are in Bloomsbury Sq., London, W.C.

Precession. In astronomy, term used in connexion with the movements of the equinoctial points, i.e. the points where the equator intersects the ecliptic. The slow retrograde movement of these points, known as the precession of the equinoxes, is due to the unequal gravitational pull of the sun and moon on the earth's equatorial protuberance. The equinoctial points take 25,800 years to make a complete circuit in the heavens, and the effect of the movement is to shorten the time between successive equinoxes and to alter the signs of the zodiac relative to those of the ecliptic. The first sign of the zodiac, for example, is no longer in Aries, but in the constellation Pisces. The precession of the equinoxes was discovered by Hipparchus about 130 B.C. See Equinox; Nutation.

Précieuses Ridicules, LES. Farceical one-act comedy by Molière, produced at the Petit-Bourbon, Paris, 1659. Molière's first essay in contemporary satire, it was directed at the imitators of the learned, if affected, coterie of the Hôtel Rambouillet. The précieuses had kindred spirits in other countries, e.g. the euphuists in England. The ridiculous euphuists of the title are two provincial belles who reject the advances of their suitors because the latter do not make love according to the novels of Mlle. de Scudéry. In revenge the suitors send two valets, Mascarille and Jodelet, to masquerade as a marquis and a viscount respectively, and dazzle the ignorant girls by their jargon and assurance until unmasked by their employers. Molière acted the part of Mascarille. Apart from its intrinsic qualities, the play is im-

portant as inaugurating a new style of satirical comedy.

Precipitation (Lat. *præcipitare*, to throw headlong). Term used in meteorology and climatology to denote the water deposited from the atmosphere. The deposit may occur as snow, rain, or hail. Rain is measured in a rain gauge, the depth of snowfall is estimated, a foot of snow being taken as equivalent to an inch of rain. An inch of rain over an acre of ground roughly equals the deposition of 100 tons of water. (See Rainfall; Weather.)

Chemical precipitation is the process of separating solid particles from a solution by adding a chemical substance. For example, if a solution of sodium carbonate is added to one of calcium chloride, calcium carbonate in the form of a white precipitate results. Many of the methods of testing employed in chemical analysis depend upon the formation of precipitates of distinctive appearances.

Précis-Writing (Fr.; Lat. *præcisus*, cut short). Process of extracting in condensed, yet easily intelligible, form the essential facts or statements contained in a letter, dispatch, or other document. Précis-writing forms an examination subject for many government departments, and is particularly used in foreign office and diplomatic work.

Precognition. Term applied in Scots law to the preliminary examination of witnesses to be called in a criminal case, usually by the procurator-fiscal and before a judge, justice, or sheriff, to determine whether there is ground for trial. The word is also used less correctly of any antecedent examination of witnesses by solicitors or counsel before their examination in court, and of the written statement, or proof, of their evidence.

Predeal Pass. Pass over the Transylvanian Alps (*q.v.*), slightly S. of Kronstadt (*q.v.*), Rumania. It was captured by the Germans, Oct. 26, 1916. See Carpathians; Rumania, Conquest of.

Predestination. Term used in Christian theology to denote the act of God in determining the destiny of nations and individuals. The doctrine of Predestination corresponds to the belief in fate which is found in some form or other in most religions—though it is sharply differentiated from it by the Christian conception of God.

The term is used in several senses to denote (1) the eternal purpose of God, which was predetermined before the creation of the world; (2) the selection of certain nations or individuals for

the performance of specific tasks in connexion with the realization of this purpose; (3) the selection of individuals as subjects for the exercise of Divine grace and the inheritance of eternal life. It is in the third sense that the term is most commonly used. The doctrine was first formulated by S. Augustine, who defines predestination as the "unconditional decree, according to which God determines to select from the fallen mass of mankind, the whole of whom are alike guilty and under condemnation, a portion upon whom he bestows renewing grace."

S. Augustine never carried the doctrine to its logical conclusion. Predestination simply affected those who were selected for redemption. It was not till the 11th century that through the influence of Gottschalk the reprobation of the wicked was included in the scheme of predestination. The Biblical data upon which the theory is based are found mainly in the Pauline Epistles, and especially in Romans viii, 29-30, and chaps. 9-11, though it is doubtful whether the words used by Paul will bear the construction placed upon them, and it is quite certain that the Apostle laid the utmost stress on human responsibility and the freedom of the will. See Augustine; Calvin; Calvinism.

Predicable (Lat. *prædicare*, to declare). In logic, that which can be predicated or affirmed of something. Aristotle distributed the predicables under four heads: property (the quality common to the whole of a class, but not necessary to distinguish it from other classes), definition, genus, accident (a quality which is not essential to the conception of a substance). These were increased by later logicians to five: genus, species, property, accident, difference (a characteristic mark distinguishing a thing from all others in the same class), difference being added, and species taking the place of definition. The question of the reality or non-reality of these predicables subsequently led to the dispute about universals (*q.v.*).



Sir W. H. Preece,
British electrical
engineer

Russell

Predil. Mt. pass of the Carnic Alps. Between Tarvis, in Carinthia, and Flitsch, in Gorizia, its maximum altitude is 3,810 ft.

Preece, Sir WILLIAM HENRY (1834-1913). British

electrical engineer. Born in Carnarvon, Wales, Feb. 15, 1834, he became associated with the Electric and International Telegraph Co., 1853; was appointed engineer to the Channel Islands Telegraph Co., 1858-62; divisional engineer to the British post office, 1870, and engineer in chief, 1892-99, and afterwards consulting engineer to the post office and colonies. Preece carried out a considerable amount of pioneer electrical work in wireless and wrote a number of books on telegraphy and telephony. He was knighted in 1899, and died Nov. 6, 1913.

Pre-emption (Lat. *prae*, before; *emere*, to buy). In English law, the right of having the first choice to buy a thing. Before the Restoration the royal purveyors had this right in respect of food, etc., required by the king and his court when travelling in the country, but it was abolished by the Act 12 Charles II, c. 24, which abolished feudalism. Under the Lands Clauses Acts, if an authority which has purchased lands compulsorily has taken more than it requires, before selling it on the market it must give the pre-emption to the former owner from whom it was compulsorily acquired. In international law, it is the right of purchasing instead of confiscating contraband of war, or such articles which, though not usually contraband, are declared so owing to special circumstances.

Pre-existence. Doctrine that the soul exists before it is united with the body. It seems to have originated in the East and underlies the caste system of India, which maintains that the social position into which a man is born indicates his merits or demerits in a previous existence. A further, more corrupt development of the idea is seen in the doctrine of the transmigration of souls. According to Plato the soul originally existed in a state of ideal perfection, but, falling short of the ideal, is condemned to enter a material body subject to decay, from which it can only gain release by self-purification and self-mortification. The Alexandrian School among the Jews embraced a similar theory, which found its way into the Christian Church, but was rejected by the council of Constantinople. According to this view, all souls were created together at the first with the soul of Adam, and remain in the keeping of God until the time comes when they are destined to be united with a body. This teaching has no foundation in Scripture, but is not considered heretical. See Creationism.

Prefect (Lat. *praefectus*, set in command). Generally, one who is in a position of authority over others. In ancient Rome the prefect (*q.v.*) was an important official. In France the prefect (*préfet*) is the chief administrative officer of each department, his seat (*préfecture*) being in the chief town of his department, and the prefect of police is the chief of the police of Paris and the Seine dept. In English public schools, and other schools on their model, the prefect is a senior boy who is responsible for maintaining discipline in a house or dormitory, and often has powers of inflicting punishment for various minor offences; the titles praepostor and monitor are also used in this connexion.

Pregnancy. Period from the time of conception to the birth of the child. The average duration of this period is 280 days, reckoned from the first day of the last menstrual period.

Cessation of the monthly flow is the first indication that a woman is pregnant, but is not a conclusive indication, since it may be due to other causes. Morning sickness usually occurs in the second month and becomes more marked in the third, fourth, and fifth months. There may be nausea alone, particularly when first wakening in the morning, or actual vomiting, and in some cases this occurs frequently during the day, and becomes a distressing symptom. Changes in the breast may be noticed during the second month, the breast becoming enlarged and the superficial veins more prominent. During succeeding months the nipples become enlarged, small raised follicles develop around them, and the pigmentation on the surrounding skin is darker. From the beginning of the third month generally a little mucoid secretion can be squeezed out of the breasts. Quickening, the term applied to the sensation experienced by the mother when she first feels the movements of the foetus within her, generally occurs in the fourth or fifth month. Enlargement of the uterus may be recognized by the physician in the second or third month, but enlargement of the abdomen is not appreciable to the mother until after the second month. During the fifth month, the foetal heart beat becomes audible through the stethoscope.

Pregnancy is a natural condition and the expectant mother should not regard herself as an invalid during the period of gestation. Any form of excess or undue exertion should be avoided, but

otherwise she should depart as little as possible from a normal life. Plenty of fresh air is important, and regular exercise should be taken, walking being the best form. A normal and nourishing diet should be taken. Excitement or mental distress should be avoided, and any sudden shock or fright is dangerous, as likely to bring on miscarriage. Cold baths should not be taken. If the breasts are painful and heavy, they may be supported by bandages, and during the last three months the nipples should be hardened by bathing them daily with spirit and water.

Spurious pregnancy, or pseudocyesis, is a condition of imaginary pregnancy which is sometimes seen in hysterical women, particularly those who have reason to fear pregnancy, and occasionally in women who are very anxious to have children. In this condition the monthly flow may cease, mammary changes occur, the abdomen enlarge (though it is only distended with gas), and the woman may assert that she feels the foetal movements. The symptoms generally disappear after the patient has been reassured by the physician regarding her condition. See Gestation; Menstruation.

Prehistoric. Antecedent to recorded history. That branch of the study of the human past which concerns prehistoric times as revealed by archaeology is sometimes called prehistorics.

Since the word was first used in 1851 by Daniel Wilson, when recording Scotland's prehistoric annals, its scope has been greatly modified. Pictorial, monumental, and other intentional records of events antecedent to writing hold an important place in recorded history. When history implies the whole past, whether known and narrated or not, prehistory loses its meaning altogether.

The beginning of written history was not the same everywhere. In the stricter sense prehistoric Egypt crossed the threshold of history with the 1st dynasty of Mena. For millenniums afterwards Europe remained in its prehistoric age, and prehistoric Britain is usually bounded by the advent of Julius Caesar. In one sense America was prehistoric until Columbus's arrival in 1492, if that of the Norsemen in 1000 be disregarded. But in view of our substantial knowledge of several centuries of Maya and Inca history, pre-Columbian is the more appropriate term.

Recorded history is sometimes held to begin with the Magdalenian cave-pictures of France and Spain.

Hence Duckworth ends his Prehistoric Man with the preceding Aurignacian period. The term is extended into prehuman or geologic time, as when mesozoic reptiles are spoken of as prehistoric monsters. When the earth's history is said to be written in "the record of the rocks" its prehistory recedes into the remotest past, before any solid crust was formed. See Archaeology; Stone Age.

Prehnite. In mineralogy, name given to a hydrated calcium and aluminium silicate. A glassy white to light green in colour, it is often a secondary mineral in eruptive rocks, and is derived from the decomposition of felspar. It resembles chrysoprase when cut and polished, and is often used as a gem stone or as an ornamental stone. Prehnite is so named from Colonel Prehn, who first found the mineral in S. Africa.

Prelate (Lat. *praelatus*, placed over). Ecclesiastical term for one having episcopal authority, e.g. an archbishop or bishop. See Archbishop; Bishop; Ecclesiastical Law.

Prelude (Lat. *prae*, before; *ludus*, a play). Musical term for a piece played before service, the opposite of postlude (*q.v.*). It is, however, less closely associated with church use, preludes being very often found in connexion with fugues and suites, as introductory pieces to plays, and as independent compositions.

Premature Birth. Birth of a child before complete intra-uterine development has been reached, and after the twenty-eighth week of pregnancy, i.e. the period at which the child has become *viable* or capable of surviving. The most common causes of premature birth are syphilis in either parent, serious constitutional disease in the mother, such as Bright's disease, lead poisoning, and heart disease, localised disease of the uterus, mental shock or excitement and violence, e.g. a fall or strenuous exercise such as riding or dancing. A prematurely born child demands special care and skill in order that it may be reared, and thrive. If the necessary attention is given, many such children become eventually quite as vigorous and well-developed as those whose gestation has been normal. See Pregnancy.

Premature Burial. Interment before life is extinct. Many persons have a morbid fear of being buried alive. In countries where some days are allowed to elapse between death and burial, thus giving time for the appearance of the undoubted signs of death, there is no fear of such an

accident. A few cases have been recorded, but always under exceptional circumstances, usually during epidemics of cholera or plague in hot countries, when fear of infection has led to hasty burial without proper examination by a physician. In Germany, mortuary chambers in which the dead are placed have been established. An attendant visits the mortuary at intervals, and a bell-rope is placed in the hands of the corpse. Some of these institutions have been in existence for many years, but the bell has never yet been rung.

Premier (Lat. *primus*, first). Anything that is first or chief, e.g. the premier duke. Its most frequent use is for the first or chief minister of the crown, also known as the prime minister (*q.v.*).

Premium (Lat. *prae*, above; *emere*, to buy). Literally a prize or reward. As a financial term it implies something above the nominal or fixed price. Thus, shares at a premium are worth more than their nominal value, e.g., when £100 of stock is at £110, it is at a premium of £10. The opposite of premium in this sense is discount (*q.v.*). In Great Britain during the housing shortage of 1918-20, money paid to secure possession of a house was called a premium. Such payments were made illegal in 1920. The term is used also for the periodical payments to an insurance company in respect of a policy of insurance. See Insurance.

Premium Bond. Bond issued for public subscription on terms involving an element of chance as well as investment considerations. They are especially popular in France where, though not actually issued by the government, they have been employed to finance state schemes. Their principal use, however, is in municipal and local finance, and a large amount of capital, about £400,000,000 in 1917, is invested in them. In Germany, the Prussian State lotteries are conducted by the German ministry of Finance.

During the Great War an attempt was made to introduce the system into Great Britain as an emergency measure for raising money, and the matter was referred to a select committee of the House of Commons. This committee examined 35 witnesses, among whom were M.P.'s, bankers, government officials, chief constables, employers of labour, and religious bodies. Their report, issued Jan., 1918, was unfavourable to the scheme, which, after debate, was rejected by a large majority, mainly on ethical grounds. See Lottery; Victory Bonds.

Premonition (Lat. *praemonēre* to forewarn). Vague, instinctive anticipation of some future event, the feeling that something desirable or undesirable is about to happen. The subject himself is unable to assign any cause or reasons for its justification. A synonymous term is presentiment, in reference to the anticipation of coming evil.

Premonstratensians or NORBERTINES. Order of regular canons founded in 1120 by S. Norbert of Cleves, afterwards archbishop of Magdeburg. They are named from their first abode near Laon, Prémontré, the "meadow shown," or the "place foreshown" to the founder in a vision. The order follows the Augustinian rule, and was very powerful in N. Europe before the Reformation. It has houses for women as well as men. In England, where Welbeck Abbey was their chief house, the Premonstratensians were known as White Canons. The order has been revived at Storrington, Sussex, and elsewhere. It was revived in France in 1856.

Prempeh. King of Ashanti, 1886-96. Chosen king of the Ashantis after a civil war in March, 1886, Prempeh took the name of Kwaka Dua III. His election was favoured by the British, and he had some prosperous years of rule. About 1893, however, he began to ignore the terms of the treaty of 1874 with Britain, and, after vain negotiations, a war began



Prempeh,
King of Ashanti

From a sketch by Sir R.
Baden-Powell, by courtesy of Methuen & Co.,
Ltd.

which ended in his seizure and dethronement. Prempeh was detained as a political prisoner, first at Elmina and later in the Seychelles. In 1924 he was allowed to return to Ashanti. See Ashanti Wars.

Prensa, LA (The Press). Daily newspaper, established in Buenos Aires in 1869, by Dr. José Paz, who was succeeded by his son, E. P. Paz. At first a four-page paper, it has given for many years now 20 to 30 pages daily. It has the largest circulation of any newspaper in S. America, and its offices, include a public hall and a courtyard for public meetings, legal and medical consulting rooms, commercial museum, chemical

laboratory, school in which Spanish is taught, suite of rooms for distinguished visitors, fencing school, and restaurant.

Prenzlau. Town of Prussia, Germany. It stands at the N. end of Lake Ucker, 68 m. from Berlin. The chief building is the Gothic church of S. Mary, a fine edifice dating from the 14th century. Among the industries are the manufacture of cigars, sugar refining, and brewing. Prenzlau, which became a town in 1235, was made the capital of the Uckermark, and was fortified about that time. There are remains of its walls and towers. In 1480 it became part of Brandenburg. In Oct., 1806, 12,000 Prussians surrendered here to Murat. Pop. 21,400.

Preposition (Lat. *praeponere*, to place before). In grammar, an indeclinable part of speech preceding a noun or pronoun in a case other than the nominative. It serves to define the relation of such noun or pronoun to some other element of the sentence. Prepositions are really adverbs, and it is incorrect to speak of prepositions "governing" certain cases. At first the meaning which it was desired to express resided in the case itself, but as the case-suffix lost force and failed to express the meaning with sufficient exactness, an adverb was added to strengthen it. The use of prepositions in the formation of compound verbs indicates their adverbial origin. The term preposition is not altogether correct. In earlier times it was sometimes a postposition, placed after the noun, as is the case now in many languages. As a language passes from the synthetic to the analytic stage, the need for prepositions increases. Thus, the dative *magistro* in Latin requires in English three words, to the master. See Grammar.

Prepotency. Biological term to express the fact that in the breeding of animals certain individuals transmit their characters to offspring more than others do. The study of heredity shows that dominating characteristics of individuals may be inherited by their offspring by successive generations, to the exclusion of other characteristics of the parents. Thus, if a Highland heifer (long-horned and light coloured) be crossed with a Galloway bull (hornless and black), the offspring is always indistinguishable from a pure Galloway breed, the Galloway characters being prepotent. Galton showed that in horses the characteristics of the sire were prepotent in most of the offspring. See Heredity; Mendelism.



La Prensa. Head offices of the Argentine newspaper in Buenos Aires

Pre-Raphaelites. Name given to a group of British artists who formed themselves into a "Pre-Raphaelite Brotherhood" in 1848. W. Holman Hunt originated the movement, and the brotherhood included D. G. Rossetti, J. E. Millais, F. G. Stephens, T. Woolner, W. H. Deverell, and J. Collinson. Launched as a revolt against the academic standard of the day, the movement aimed primarily at a return to the simpler and more natural ideals of art before Raphael. Its expression was complex; realism (Hunt and Millais) and romanticism (Rossetti) declared themselves as two different tendencies from the first; but brilliant colour and a minutely detailed technique were common to all the principal exponents. Ruskin lent whole-hearted support, Ford Madox Brown was an ally, John Brett adopted the technique in his seascape, and certain later painters—Burne-Jones, F. Shields, Noel Paton among them—preserved the pre-Raphaelite tradition. Millais seceded after a while; but Hunt adhered to the original

aim and method to the end of his life. See Art: Brown, Ford Madox; Burne-Jones; Hunt, W. Holman.

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Prerogative (Lat. *praerogare*, to ask before). In general, an exclusive right or privilege belonging to a person or body in virtue of his or its status or character. Thus the royal prerogative is the rights claimed to be inherent in the crown, either as established by historic custom, or as given by direct gift of God. The divine origin of prerogatives, as claimed by the Stuarts, was an important issue in the political philosophy of the 17th and 18th centuries. At the present day the royal prerogative includes such powers as those of declaring war, summoning and dismissing parliament, creating peers, and pardoning offenders. In theory, the royal prerogative has an extremely wide range of power, but in practice it is exercised only through the privy council or the cabinet. The crown enjoys many personal rights and privileges by prerogative, such as personal irresponsibility for crime, exemption from taxation, etc.

The prerogative court was an ecclesiastical court for testamentary cases. Those of the archbishops of Canterbury and York had their jurisdiction transferred to the court of probate in 1857. Prerogative writs are in the nature of commands for the better execution of justice or the protection of the liberty of the subject, issued by order of the judges of the court of king's bench. The principal of these are writs of Habeas Corpus, Mandamus, Certiorari, and Quo Warranto. These are issued only on proper cause shown to the court. See Divine Right; King; Writ.

Prerov or **PRERAU.** Town of the republic of Czecho-Slovakia. In the Moravian division, it is 15 m.



Prerov, Czecho-Slovakia. General view of the town

S.E. of Olomouc (Olmütz). It contains a Gothic town hall and an old castle once the residence of King Matthias Corvinus, and has manufactures of woollens, beet sugar, and farm implements. Prerov was formerly the headquarters of the Moravian Brethren. Pop. 20,000.

Presan, GENERAL (b. 1861). Rumanian soldier. Born in Wallachia, Jan. 27, 1861, he was educated at the



General Presan,
Rumanian soldier

at the Military Academy, Bukarest, and entered the army as a lieutenant in the artillery in July, 1880, becoming a general in May, 1907. On

the entry of Rumania into the Great War in 1916 he was in command of the Rumanian Fourth Army, and in Nov. was commander-in-chief of the Rumanian Third and Fourth Armies, taking part in the battle of the Argesul, especially in that portion of it which was fought S.W. of Bukarest and is known as the battle of the Neajlovu. Later, when Averescu was appointed

generalissimo under King Ferdinand, Presan became chief of staff.

Presanella. Mt. mass of S.W. Tirol. It is situated N.E. of Monte Adamello (*q.v.*) and reaches an alt. of 11,690 ft. It was first ascended by Freshfield in 1864.

Presbyopia (Gr. *presbys*, old man; *ops*, eye). Diminution in the power of focusing the eye, owing to advancing age. Near objects must be held increasingly farther from the eye in order to be seen distinctly. The condition is corrected by wearing convex glasses. See Eye; Sight.

Presbyter (Gr. *presbyteros*, elder). Alternative name for an elder of the early Christian Church, the principal official of a Jewish synagogue, and for a member of the Sanhedrin. In the Presbyterian churches it is applied to a member of a presbytery and to a ruling elder. See Bishop; Elder; Priest.

PRESBYTERIANISM: ORIGIN & POLITY

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In connexion with this subject see the articles Calvinism. Dutch Church; Huguenots; Protestantism; Reformation; Scotland, Church of. See also the article Christianity, those on the various branches of Christianity; and biographies of Knox and other leaders of Presbyterianism

Presbyterianism is the name for the organization of the Christian Church on the basis of rule by presbyters. These are chosen by the congregations and set apart for their twofold duties of teaching and ruling, the former office, which includes the administration of the sacraments, corresponding to the clerical, the latter to the lay element in other churches. The presbyters are equal in rank, electing temporary moderators or presidents from their own number in the presbyteries, synods, and general assemblies, which form the three church courts.

Thus the three notes of Presbyterianism are: the parity of the clergy, in distinction from the episcopal system or the papal; the right of the congregation to govern itself by means of office-bearers chosen from its own members—a primitive right which was only taken gradually from the early Church; and the avoidance of congregational individualism by means of administrative unity secured in the church courts, where the presbyters sit as representatives of their various congregations. The presbyters are not mere delegates, however; they are ordained for life, whether as ministers or as ruling elders.

When the Reformation broke up the monarchical idea of church polity which had been developed

in the Middle Ages, the attempt to express the functions of a Christian church in polity led Calvin to organize the Genevan church on a presbyterian basis. Wherever the reformed church found itself in a monarchy, the tendency was to conserve the episcopal polity in a more or less modified form, as in the English and the Scandinavian churches. But where the church had to assert its independence against the civil authorities, as especially in Holland and Scotland, the presbyterian polity proved more effective; it secured for the congregation their right of self-government, although it is a mistake to identify this instinct off-hand with any modern democratic tendency; it also safeguarded the church against anything like sacerdotalism. In insisting that the jurisdiction of the church must be in the hands of the church, Presbyterianism also insisted that the church was not simply the clergy.

Question of Divine Right

From the 17th century onwards a hot controversy raged upon the divine right of episcopacy or presbytery, which is only ceasing in our own day as historical scholarship intervenes to prove that originally the conditions of the church held both elements together, that neither can claim more than validity on the basis of prac-

tical convenience, and that the development in the 2nd century, which led ultimately to the mediæval system of bishops and cardinals, derived from political exigencies which no longer exist, or from doctrinal movements which are open to question. All that Presbyterianism, or any other form of polity, can claim is that it suits the genius of the Church and conserves its practical ends, that it guarantees whatever is requisite to the well-being and efficiency of the Church as God's people.

Historically it is justified by its success. Even in England, as Matthew Arnold pointed out, Hooker wrote his great treatise "not because episcopalianism is essential, but because its impugnors maintained that presbyterianism is essential, and that episcopalianism is sinful. Neither the one nor the other is essential or sinful, and much may be said on behalf of both. But what is important to be remarked is, that both were in the Church of England at the Reformation, and that Presbyterianism was only extruded gradually."

The opposite process took place in Scotland, and it was largely due to Scottish settlers that Presbyterianism spread rapidly in Ireland from the 17th century onwards, whereas the Presbyterian Church in Wales owed its origin to English impetus in the 18th century.

Huguenots and Calvin

On the Continent, the French Huguenots naturally followed Calvin, though they organized their presbyterian polity on slightly different lines. East of the Rhine, political conditions hindered the presbyterian polity, but Bohemia, even before Calvin, had developed a semi-presbyterian system, and the remarkable church of Hungary, with over half a million members, attests the vigour of the presbyterian system and its appeal to the reformed Christians of that country. Together with the scattered and smaller communities, which are thus organized elsewhere upon the Continent, the Dutch, British, French, Swiss, and Hungarian Presbyterians now number about five millions, and the polity has proved itself flexible enough to live and thrive amidst the complex environments of modern life.

It was European immigrants who started Presbyterianism in America, but not until the beginning of the 18th century. Here Presbyterianism is divided into a number of churches, whose origin is partly due to racial reasons, partly to doctrinal ones. Next to

the Methodist and the Baptist churches, they rank among the largest divisions of American Protestant Christianity.

In Canada the first Presbyterian movement was made by the Huguenots in the 17th century. The ill-judged policy of France, which reserved Canada for the Roman Church, checked this attempt. But during the next century the British immigrants took up the cause, and in the eastern and western provinces the Presbyterians are now numerically second only to the Methodists. A similar process has led to the formation of the strong Presbyterian churches in the southern hemisphere; from Scotland, and in part from Ireland, the Presbyterian churches of Australia and New Zealand were founded. In S. Africa, on the other hand, the impetus came from the Dutch, and the British section is smaller. When isolated missions and sections, e.g. in the West Indies and in Asia, are included, the numerical strength of Presbyterianism at present is reckoned at close upon six and a half millions.

Education and Discipline

The efficiency of the polity is shown by its development of education and of discipline. The Presbyterian churches have invariably set a high standard of education for their ministers, and this has been accompanied by a corresponding conscience for instructing the people in the faith, and also for education in schools. A presbyter must "be apt to teach" according to the New Testament, and Presbyterianism has never forgotten this duty; the administration of the sacraments, for example, is steadily viewed as only one aspect of preaching the Word. As for discipline, each congregation is ruled by its own kirk-session, presided over by the minister, and consisting of elders (presbyters) elected by the people, who share the spiritual supervision of the congregation with him, aid him in administering the Lord's Supper, and generally further the religious interests of the church.

Each minister, with one or more elders from his congregation, is a member of the local presbytery, the main difference being that the minister is a permanent member, whereas the elder is elected for a term of years. All members of the presbytery are members of the local synod, composed of a number of presbyteries. The function of a synod is to transact business which comes up from presbyteries as a court of review; but all its decisions are liable to come before the general assembly. The synod is

provincial, but the assembly, which meets once a year, is national. Each presbytery sends up a fixed number of delegates, ministers, and elders. A moderator is chosen, who holds office for one year. This is the final court of appeal, and any business may come up before it from a kirk-session or presbytery by regular forms of petition. The general assembly thus represents the entire church, and its decisions cannot be reversed, except by a subsequent assembly.

A large part of the success of Presbyterianism lies in this carefully organized recognition of popular government, which on the one hand leaves the individual congregation free to manage its own affairs and yet prevents any selfish or eccentric action, which puts the minister in a position of independence instead of leaving him at the mercy of a local few, and at the same time gives to the congregation a reasonable control over him. Thus no congregation can interfere with its minister except through the presbytery, and no one kirk-session can review or object to the proceedings of another. On the other hand, a presbytery has certain powers over all church work done by the congregations belonging to it. In mission extension this polity is found effective. Weaker causes can be helped by stronger ones, and advances can be made in the way of church extension by means of concerted effort.

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Presbytery (Gr. *presbyteros*, elder). Word originally applied to that part of a church which was occupied by the clergy. First of all situated behind the altar, with the seat of the bishop in the middle, it was divided from the rest of the building by a rail or screen. In later times it meant the space immediately before the altar, as distinguished from the choir.

The term was also used to signify the body of the clergy taken together. In this sense it occurs in the Greek N.T. (1 Tim. iv, 14), and is thus used in the Presbyterian denominations, more especially for the official assemblies of ministers for the transaction of business. The word is used by some of the Fathers in the sense of the office of a presbyter or priest, and it is often used—especially in the Roman Church—for the residence of the priests connected with a church.

Prescot. Urban dist. and market town of Lancashire, England. It is 7 m. from Liverpool,

with a station on the L. & N.W. Rly. The principal building is S. Mary's church. The chief manufactures are watches, electric cables, and pottery, while in the vicinity are coal mines. Cattle fairs are held. Near is Knowsley (q.v.). Market days, Tues. and Sat. Pop. 8,200.

Prescott. City of Arizona, U.S.A., the co. seat of Yavapai co. The former state capital, it was superseded in 1891 by Phoenix, from which it is 133 m. N. by the Santa Fé, Prescott and Phoenix Rly. Cattle breeding, farming, and the mining of gold, silver, and copper are carried on in the neighbourhood. Pop. 5,000.

Prescott, WILLIAM HICKLING (1796–1859). American historian. Born at Salem, Mass., May 4, 1796,

the son of a distinguished judge, and grandson of Colonel Prescott, who commanded the American forces at Bunker Hill, he was educated at Harvard, where he graduated with distinction in 1814.

While at college he lost the sight of one eye, and the other eye became so badly affected that for long spells he was virtually blind. He entered his father's legal office, but owing to the state of his eyes had to abandon the law. He then determined to devote himself to historical study, and with the aid of readers and secretaries, by patient memorising and the use of a writing frame made for the blind, wrote the works which are among the classics of history written during the 19th century. Those works were History of the Reign of Ferdinand and Isabella, 1838; History of the Conquest of Mexico, 1843; History of the Conquest of Peru, 1847; and the unfinished History of the Reign of Philip II, 1855–58. He died in Boston, Jan. 27, 1859, and was buried in S. Paul's church there. His collected works were published in 16 vols., 1870; and in 20 vols., 1906. See Lives, G. Ticknor, 1864; R. Ogden, 1904; H. T. Peck, 1905.

Prescription (Lat. *praescribere*, to write beforehand). In law, title by long use and enjoyment. Such title is founded on two conceptions: (1) that when anyone has enjoyed a right for a considerable length of time it is probable that the right has a legal origin; (2) that even if the original possession was not founded on strict legal right, at any rate all rival claimants have



W. H. Prescott.
American historian

acquiesced in it; and in all systems of law it has been found necessary, and to the public advantage, to discountenance stale claims.

In English law, by an Act of 1833, uninterrupted possession for 12 years gives a good prescriptive title to land. A right of light enjoyed for 20 years is indefeasible, unless it can be shown that it was enjoyed not as of right, but under a written agreement or permission. A right of common is *prima facie* established by 30 years' enjoyment; and absolutely by 60 years'; again, in the absence of a written agreement. An easement (*e.g.* a right of way, or of water, or of support) is *prima facie* conferred by 20, and absolutely by 40, years' uninterrupted use, and in the absence of a written agreement.

Corporations by prescription also exist. A corporation could only be created at common law by royal charter; but when a body is found which has from time immemorial acted as a corporation, though its charter cannot be found, it is presumed to have been created a corporation lawfully. The City of London is an instance of such a corporation by prescription. *See* Borough; Right of Way.

Present. In grammar, one of the tenses, or times, of the verb. Strictly, it denotes an action or event taking place at the time when it is referred to: I am writing; it is raining. The present is also used of habitual actions, *e.g.* he goes to school every day; of past events (historical present), *e.g.* he draws his sword; of future events, *e.g.* I start to-morrow.

Presentation. Eccles. term for the offering to a bishop, by the patron or owner of a benefice or living, of a clerk in holy orders as a suitable incumbent of that living. The English law governing presentation is set out in the Benefices Act, 1898. *See* Advowson; Benefice; Ecclesiastical Law.

Presentment. In English law, the presenting to the court by a grand jury of some facts of which they desire the court to take notice. The usual instance is where a grand jury present a criminal for trial on an indictment, which always begins "The jury on their oath *present* A. B. that he did, on the —th day, etc., feloniously steal, etc., etc." The system of presentment also prevails in America. It is not limited to crime, *e.g.* a grand jury can present for a public nuisance. *See* Jury.

Presidency. Former administrative division of British India. The name was originally given to those units of the East India Company's territory administered

by the presidents of the company's factories. The original three were Bengal, Madras, and Bombay (*g.v.*), and the last two retained the title. All three are now among the administrations of India. *See* India.

Presidency Bank. Name given to three Indian banks, one in each of the three presidencies. The bank of Bengal was founded in 1806, the bank of Bombay in 1840, and the bank of Madras in 1868. The bank of Bombay was refounded in 1868. The banks were regulated by an Act of 1876, before which date the Indian government held a large part of their capital, and they had the right of issuing notes. Later this was not so, but they acted as bankers to the government. In 1920 the banks were amalgamated as Imperial Bank of India.

President (*Lat. praesidere*, to sit in front of). Word which denotes headship, with many applications. It is the recognized title of the head of a republic. The head of a college in a university is sometimes called the president; in some colleges at Cambridge the title is applied to the second official. The term is also used of the head of a society, and in the U.S.A. of the chairman of a company. The word occurs in the title of many British ministerial and legal officers, *e.g.* lord president of the council, president of the board of trade, president of the probate, divorce and admiralty division, and president of the court of session. *See* Republic.

President, H.M.S. Vessel of the British navy. The first President was a vessel of 42 guns built under the Commonwealth, and renamed Bonaventure at the Restoration in 1660. In 1887 a sloop of 1,140 tons was launched at Sheerness and named President. With her engines removed, she was stationed between Blackfriars Bridge and the Temple Stairs, and served as a stationary drillship for the London division of the Royal Naval Volunteer Reserve until

1922. In that year a larger training ship, the Saxifrage, a sloop built during the Great War, and renamed the President, took its place. The great majority of naval officers serving at the Admiralty, or under the direct orders of Admiralty departments, are borne on the books of the President for purposes of pay and records.

Press. Comprehensive term for the output of the printing press. It is especially applied to newspapers and periodicals. *See* Amalgamated Press; Censorship; Freedom of the Press; Journalism; Newspaper.

Press Association, LTD., THE. Organization of British provincial newspaper proprietors. Founded in 1868, on cooperative principles, to collect and distribute news, it began operations Feb. 5, 1870, coincidentally with state control of the telegraphs. A P.A. message was the first press message to be sent over the Government wires. About a third of the Government revenue from press messages is paid by the association, which serves nearly 150 provincial journals in addition to London newspapers, while outside the metropolis it has the monopoly of Reuter's foreign service. Its managers have been John Lovell (1868-80); Sir Edmund Robbins, who was knighted in 1917, when he retired after 47 years' service; and H. C. Robbins. Richard Whiteing was one of the original sub-editors. It purchased and absorbed in 1919 the London News Agency.

Press Bureau. British Government department. It was founded Aug. 7, 1914, on the outbreak of the Great War, to issue official information to the newspapers, and to censor matter submitted to it for publication by the press. Its chief purpose, under the Defence of the Realm Act, was to prevent the dissemination of false news, of news likely to be of value to the enemy, and of views calculated to aid enemy objects during the Great War. Its operations were subjected to severe criticism in press and Parliament, but friction lessened with the improvement of its personnel and organization.

The first institution of its kind in Great Britain, it consisted originally of a director (F. E. Smith, later Lord Birkenhead),



H.M.S. President. Drillship of the R.N.V.R., formerly anchored in the Thames between Blackfriars Bridge and Temple Stairs

secretaries, and a few naval and military officers; but by May, 1915, its staff included a director, two assistant directors, a secretary, and about 50 censors, of whom the majority were appointed by the admiralty and the war office. The first director resigned soon after the publication of The Times Amiens dispatch of Black Sunday, Aug. 30, 1914. He was succeeded by Sir Stanley Buckmaster, Sept., 1914-May, 1915. Then, with the home secretary as nominal chief censor, Sir E. T. Cook and Sir Frank Swettenham became joint directors. After the United States came into the war, a Public Information Bureau was founded at Washington to circulate reliable war news. It assembled this news in a daily Bulletin, which was sent to the newspapers. The British office came to an end, April 30, 1919. See Censorship; consult also The Press in War Time, E. T. Cook, 1920.

Pressburg. City of Czecho-Slovakia, in the Slovakia division. Known officially as Bratislava, it was formerly in Hungary, and was then officially styled Pozsony. The historic city gives its name to the Gate of Pressburg, between the Little Carpathians and the heights of Burgenland, through which the Danube flows E. from the basin of Vienna. Since 1526 the kings of Hungary have been crowned here, in the Gothic cathedral of S. Martin, and here the Hungarian Parliament met in the Landhaus until 1848. The town hall houses the Municipal Museum; near by is the Franciscan Church, founded in 1272. The ruins of the royal palace, which was burned down in 1811, crown a wall-encircled plateau at a height of 270 ft. above the river; access to the enclosure is gained through



Pressburg arms

a massive Late Gothic gateway. There is an iron bridge across the river. The industries include petroleum refining and the manufacture of tobacco, furniture, leather, and machinery. There is a Slovak university. Pop. 73,000.

Press Cuttings. Articles and news items cut from newspapers and magazines by authors, journalists, and others, and kept for reference. Several agencies methodically supply cuttings on subjects specified by their subscribers, and special books and cabinets are made for their preservation. To keep these cuttings alphabetically in marked envelopes in a cabinet is preferable to pasting them in books. Cuttings lose their reference value if the date and place of their original appearance are not accurately noted.

Pressensé, EDMOND DEHAUT DE (1824-91). French Protestant pastor and politician. Born in



E. D. de Pressensé,
French pastor

Paris, Jan. 7, 1824, he studied in Lausanne, Halle, and Berlin, and became a pastor in Paris, 1847. In 1854 he founded the *Revue Chrétienne*, an influential journal in Protestant France; he served in the war of 1870-71, became republican liberal deputy, 1871, and senator in 1883. Among his published works are *L'Eglise et la Révolution Française*, 1864; *Le Concile du Vatican*, 1872; and *Les Origines*, 1883. He died in Paris, April 8, 1891.

Pressensé, FRANCIS DEHAUT DE (1853-1914). French diplomat and author. Born in Paris, son of Edmond D. de Pressensé, he served in the Franco-Prussian War, 1870-71, held diplomatic appointments at Constantinople and Washington, and became foreign editor of *Le Temps*. A prominent contributor

to *L'Aurore*, he strongly defended Dreyfus (*q.v.*), was for a time socialist deputy for Lyons, and promulgated the idea of a United States of Europe.



F. D. de Pressensé,
French diplomat

He died Jan. 19, 1914. His works include *L'Irlande et L'Angleterre depuis l'acte d'union jusqu'à nos jours*, 1889; *Le Cardinal Manning*, 1896; *L'idée de Patrie*, 1899.

Press-Gang. Name given to the bodies of men who formerly carried out the impressment of those liable to forced service in the army or navy. Although impressment (*q.v.*) could be either for land or sea service, it came to be used almost entirely to secure recruits for the navy. Edward III set up a commission of impressment, 1355, and the methods of carrying out the press were regulated by statute in 1378, and on other occasions. In 1641 Parliament declared the system illegal, but it was used later for land service by Cromwell, and throughout the 18th century and until 1815 the press-gang, called in Elizabethan times the "takers," was a common and unpopular feature of seaport life.

Seafaring men between 18 and 55 years of age were liable, with certain excepted classes. It was customary for the press-gang to land from a warship, seize likely men, and convey them to the ship as prisoners. Brutality was rife, and violence was often caused, as the novels of Smollett and Marryat bear witness. Even sailors actually serving on board a merchantman could be seized, and vessels were thus sometimes left almost helpless. In 1798 the exemption of certain classes of seamen was suspended for five months. The press-gang method was efficient neither in the quality nor always in the number



Pressburg, Czecho-Slovakia. View from the right bank of the Danube, showing the ruins of the palace, formerly the residence of the kings of Hungary, which was burned down in 1811

of the recruits secured by it.

The system disappeared after the Napoleonic wars. An Act of 1835 limited the service of men so taken to five years, but the right of impressment was never disowned. See Navy; Recruiting.

Pressow. Alternative name of the town of Czecho-Slovakia better known as Eperjes (*q.v.*).

Press Service of Canada. NATIONAL Co-operative association inaugurated Sept., 1917, with the support of the Canadian Government, relieving the Atlantic and Western Provinces of the

Dominion of dependence upon American news agencies, and placing its news services at the disposal of American newspapers through the Associated Press. The association operates 12,000 m. of leased wire, connecting Sydney, Cape Breton, with Victoria, British Columbia, and was regarded at its inauguration as an important step towards a Press Union of the British Empire.

Pressure. Sum of the forces exerted on its surroundings by a solid, liquid, or gas. Pressure is usually measured in terms of the area and the force exerted, *e.g.* 100 lb. per sq. in., or 10 kilogrammes per sq. centimetre. The unit of pressure is the unit of force acting on the unit of area. The centre of pressure of a body is that point at which the resultant of all the pressures may be assumed to act. See Gas.

Pressure Gauge. Instrument for measuring the pressure of fluids. For ordinary purposes pressures are expressed in pounds per sq. in. or kilogrammes per sq. cm. The form of gauge most widely used by engineers is the Bourdon, which takes advantage of the fact that an elastic tube of flat section, bent to a curve and closed at one end, will endeavour to straighten itself out, if a gas or liquid be forced into it.

Another form of gauge, the Schäffer-Budenberg, depends for its action on the elasticity of a thin corrugated metal plate, ex-



Press-Gang. A waterman seized by the press-gang on Tower Hill on the morning of his marriage day. From the picture by A. Johnston

posed to pressure on one side. As the plate bulges outwards, it pushes up a rod which actuates a quadrant and rack like that of the Bourdon gauge. Vacuum gauges for condensers, brake apparatus, etc., are similar to those described above, but their motions range in the inward direction from the normal position of the spring or disk, and the index hand is set accordingly. Spring-controlled pressure gauges should be tested periodically for accuracy, as a spring is liable to lose some of its elasticity. Tests are made by means of either a miniature hydraulic accumulator with a sensitive ram weighted to give any desired pressure, or a gas manometer. In this instrument a body of gas, usually air, is imprisoned in a glass tube and compressed by a column of mercury. Readings are taken in accordance with Boyle's law that the pressure of the gas varies inversely as the space occupied by the gas.

The hydrostatic manometer is useful for measuring small pressures, such as those in stokeholds under forced draught, gasometers, etc. It consists of a glass U-tube containing mercury or water. One leg is open to the air, the other to the chamber, the pressure in which is being tested. The pressure is estimated from the difference in level of the surfaces in the legs, and expressed in inches of mercury or water, as the case may be.

In ballistics, a pressure gauge is an instrument for measuring the pressure developed by the gases when an explosive is fired in a closed space. It consists of a stout steel body having at one end a piston, provided with a gas check consisting of a copper cup. The inner end of the piston bears against a copper cylinder, and the extent to which the latter is crushed is equivalent to the pressure developed. See Manometer; Nobel Pressure Gauge.

Prestatyn. Urban dist. and market town of Flintshire, Wales. It stands on the coast and is 4 m. from Rhyl, with a station on the L. & N.W. Rly. There are ruins of a castle, and in the neighbourhood are lead mines. Pop. 2,000.

Presteign. Urban dist. and market town of Radnorshire, Wales, also the county town. It stands on the Lugg, 151 m. from London, with a station on the G.W. Rly. The chief buildings are the parish church of S. Andrew, dating mainly from the 15th century, the guild hall, and the market hall. The Warden is a hill converted into a public recreation ground; the castle formerly stood here. John Bradshaw, the regicide, was born in the town, and the old residence of his family is now an inn. Market day, Wed. Pop. 1,100.

Prester John. Priest-king in the 12th century. The centre of many legends and theories, by name Jorkhan or Coirkhan, and a native of Asiatic Tartary, he is said to have been converted by Nestorians from Buddhism to Christianity. When he became king he assumed the title of Prester, *i.e.* presbyter or elder, vanquished the rulers of Media and Persia, and attempted to march to the aid of the Church at Jerusalem, but got no farther than the Tigris. He was succeeded by his son or brother, who also called himself Prester John, and who was killed by Jenghiz Khan.

He was reputed to have been a descendant of the ancient Magi. Pope Alexander III is reported to have addressed him as king of the Indies and most holy of priests. Marco Polo's report of a Christian kingdom in India named Abascia, or a conjecture of a Portuguese traveller, Peter Covillanus, in the 15th century, appears to be responsible for the theory that the land ruled by Prester John was Abyssinia. J. E. Fischer, in his History of Siberia, attempted to identify him with the first Grand Lama of Tibet.

Described in the Travels of Sir John Mandeville as a descendant of Ogier the Dane, one of the paladins

of Charlemagne, Prester John is referred to in Shakespeare's *Much Ado About Nothing*, figures in Ariosto's *Orlando Furioso* as a blind king of Ethiopia, and gives his name to an African romance by John Buchan, 1910.

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Preston. County and mun. borough and seaport of Lancashire, England. It stands near the head of the Ribble estuary, 209 m. from London and 31 m. from Manchester, with stations on the L. & Y.

so called because of the number of its religious houses. The first charter was granted in 1179, and others followed, granting the citizens fairs, markets, and other privileges. It became prosperous owing to the decline of Ribchester. A Roman Catholic stronghold since the Reformation, in 1715 the Jacobites took possession of Preston. It was thereupon attacked by the king's troops, the result being that Forster and 1,400 men surrendered. Preston was the birthplace of Arkwright, who, in 1769, erected his spinning jenny here. An ancient festival known as the Preston guild is held here every 20 years, the first on record having taken place in 1328. Preston is governed by a mayor and corporation, which, in 1921, took over from a private firm the electric lighting undertaking. It owns also the docks and harbour.

Preston sends two members to Parliament. Market day, Sat. Pop. (1921) 117,426.

Preston, BATTLE OF. Fought between the Scots

brought to action were pursued by Cromwell, and at Winwick another 2,000 were taken prisoners. Many of the others surrendered at Warrington, while their leader, the duke of Hamilton, and the cavalry gave themselves up to the parliamentarians at Uttoxeter.

There was some fighting at Preston during the Jacobite invasion of England in 1715, and some 1,500 Jacobite prisoners were taken, including their leaders, Thomas Forster and the earl of Derwentwater. See Civil War; Jacobites.

Preston North End. English professional Association football club. One of the first clubs to adopt professionalism, Preston North End was also one of the original twelve clubs to form the Football League, founded in 1888, the championship of which they won in the season of its inception and the following season, 1889-90. In 1901 they were relegated to the second division of the League, which they headed in 1903-4, thereby securing readmission to the premier division. They retired again at the end of season 1911-12 to the second division, which they headed the following season. After another year in the first division they once more lost their place in 1913-14, only to return again by finishing second on the table in the minor competition in 1914-15.

Preston won the Football Association cup in 1889, when they defeated the Wolverhampton Wanderers at Kennington Oval by three goals to nil. In that season they set up the record performance of winning the Football League without losing a match, and the F.A. cup without conceding a goal, thus sharing with Aston Villa the honour of securing both trophies in one year. Their ground is at Deepdale Road, Preston, and their colours are white shirts and dark blue knickers.



and L. & N.W. Rlys. A canal connects it with Lancaster. The buildings include the modern town hall, post office, sessions house, the Harris institute, the Harris free library and museum, the technical school, and the corn exchange. There is a grammar school, founded in 1550, and the town has several parks, Avenham Park, Moor Park, and Deepdale among the m. The



Preston arms

churches, which include several belonging to the Roman Catholics, are all modern. The chief are S. John's and the Roman Catholic S. Walpurgis. Preston is one of the chief centres of the cotton industry; it has also engineering and machinery works, iron and brass foundries, and shipbuilding yards. There is a harbour which has docks covering 40 acres, and, owing to the deepening of the channel after 1884, vessels of 3,000 tons can reach the port. Horse and cattle fairs are held. Fishwick is a suburb.

The name Preston is a corruption of priests' town, it having been



in the interests of Charles I and the parliamentarians under Cromwell, Aug. 17, 1648. Cromwell's army numbered about 9,000; the royalists had 24,000, not all engaged at once. Some 4,000 royalists surrendered at Preston, and at least an equal number afterwards. Those who had not been



Preston, Lancashire. 1. The Art Gallery, showing the Sessions House on the left. 2. Town Hall, built in 1867 from designs by Sir Gilbert Scott. 3. Fishergate, one of the busiest streets

Prestonpans. Police burgh of Haddingtonshire, Scotland. It stands on the Firth of Forth, 9 m. from Edinburgh, with a station on the N.B. Rly. The chief industries are the making of bricks and tiles, fishing and brewing, while near are large coal mines. The salt industry, whence the word pans in the name of the town, disappeared about 1800. It was begun about 1200 by the monks of Newbattle, and was flourishing in the Middle Ages. Prestonpans was made a burgh in 1617. Pop. 1,900.



Prestonpans, Haddingtonshire. Highlanders capturing the royalist guns at the battle of Prestonpans. From the painting by Sir W. Allan. Top, right, main street of the town

The battle of Prestonpans was fought between the royal troops and the Jacobites in 1745. The former under Sir John Cope, about 2,300 strong, landed at Dunbar, and marched towards Edinburgh. Prince Charles Edward with an equal force set out from that city to meet them, and the armies came face to face at Prestonpans on Sept. 21. The Highlanders dashed upon the waiting royalists under cover of the morning mist, and in a few minutes the guns were captured and the infantry put to flight, being cut down as they ran. Cope's army was destroyed, and he, with a few horsemen, fled to Berwick. The Jacobites called the engagement Gladsmuir.

Prestwich. Urban dist. of Lancashire, England. It is 4 m. from Manchester, with a station on the L. & Y. Rly. The chief building is the 13th century Gothic church of S. Bartholomew, and the chief industry the manufacture of cotton. Here are reservoirs for supplying Manchester with water. Near is Heaton Park, once a seat of the earl of Wilton; it now belongs to the city of Manchester. Pop. 17,200.

Prestwich, Sir Joseph (1812-96). British scientist. Born at Clapham, March 12, 1812, he was educated at private schools and at

University College, London. He entered business life in London, but spent his leisure in the study of geology, making himself one of the foremost geologists of the day. His work brought him a number of honours, including that of F.R.S. He was regarded as an authority on coal, was a member of the royal commission on the water supply, and contributed to our knowledge of primitive man. From 1874-87 he was professor of geology at Oxford. Knighted in 1896, he died at Shoreham, Kent, June 23, 1896. His chief work was *Geology: Chemical, Physical, and Stratigraphical*, 1886-88. See *Life and Letters*, 1899, by his wife, Lady Prestwich.



Prestwich, Ayrshire. Part of the main street

Prestwick. Police burgh of Ayrshire, Scotland. It stands on the Firth of Clyde, 2 m. from Ayr, with a station on the Glasgow and S.W. Rly. An ancient place, there are ruins of a church said to have been built in the 12th century. It was made a burgh in 1600. Today it is chiefly

known as one of the great golfing centres of Scotland. Pop. 4,900.

Prestwood. Village of Buckinghamshire, England. It is 11 m. from Aylesbury, and has a modern church, Holy Trinity. There is a memorial to John Hampden, who was assessed for ship money on his lands in this parish.

Presumption. Legal term for an inference of fact drawn from established facts. Presumptions are a branch of the law of evidence, and are of two kinds: (1) *Juris*, or rebuttable, where, a fact or set of facts being proved, the court is bound to draw a particular inference; but that inference may be disproved by evidence. (2) *Juris et de jure*, or irrebuttable, where, a fact or facts being proved, the court is bound in law to draw a particular inference; and no proof can be received that such inference is false.

PRESUMPTION OF DEATH. In the probate court, in England, leave is sometimes granted to presume the death of a person who has for a long time disappeared from his home and friends, or who has probably lost his life in such circumstances as to leave no trace, e.g. a sailor who can be shown to have shipped on a vessel which has not arrived in the port of destination; or a soldier who was one of a party which was struck by a big shell.

Further, by the statute 18 and 19 Car. II (England), when a lease is granted for the life of A, and A has not been heard of for seven years, the lease may be determined, as A is presumed dead. But if A proves to be alive, the lessee must be reinstated. A law of 1841 makes provision for Scotland; but with an absolute bar after 13 years' disappearance.

Pretender (Lat. *praetendere*, to hold forward). One who makes a claim which is either false or not admitted. The term is most frequently used for those who claim crowns to which they are not lawfully entitled, e.g. Lambert Simnel. In a special sense the word is applied to the son and grandson of James II, referring to their claim to the throne of the United Kingdom. James Edward is known as the Old Pretender, and his son Charles Edward as the Young Pretender. See Charles Edward; Jacobites; James Edward.

Pretoria. City of the Transvaal, the capital of the province and the administrative capital of the Union of South Africa. It is by rly. 1,000 m. from Cape Town and 45 m. from Johannesburg. It is also on the direct line from Durban and is an important rly. junction. It stands on both sides of the Aapies river, at the foot of the Magaliesberg Mts.

The centre of the town is Church Square, from which the main streets radiate. The chief buildings are the block erected for the Union Government and opened in 1912, in which is accommodation for the public officials. Another fine pile in Church Square is occupied by the Government of the Transvaal. Government House, the residence of the governor-general, in Union Buildings, overlooks the town, and in Pretorius Street are other public offices. There is a fine railway station, law courts, and a large post office. Other erections are the town hall and the market buildings. There is a state library and a museum.

Of religious edifices the chief is the Anglican cathedral of S. Alban, and there are many other churches. The Transvaal Univer-



Pretoria. Plan of the central districts of the capital city of the Transvaal

sity College is here, and there are other buildings used for educational purposes. The city has a fine public hospital and a lunatic asylum. A number of parks beautify it, among them being Burger's and Prince's Parks, the latter named in memory of Prince Christian Victor. The

Pretoria was founded by M. Pretorius, the first president of the Transvaal. In 1860 it became the seat of government. Pop. 49,000.

Pretorius, ANDRIES WILHELMUS JACOBUS (1799–1853). Boer leader. One of the leaders of the Great Trek, he reached Natal in 1838, where he was elected commandant-general, leading his commando against the Zulus, 1839, and the British, 1842. In 1852 he concluded the convention with Britain whereby the latter recognized the independence of the Transvaal. He died July 23, 1853.

Pretorius, MARTINIUS (1819–1901). Boer leader. Son of Andries Pretorius, he succeeded to the general command on his father's



zoological and botanical gardens should be mentioned. There are hotels, clubs, banks, and two daily papers. The city has a good water supply, and a service of electric tramways.



Pretoria, Transvaal. 1. Law Courts, completed in 1898, and used as a hospital during the S. African War. 2. Parliament Buildings, seat of the provincial legislature. 3. Union Buildings, erected 1910-13, seat of the Union Government of S. Africa

death, and prosecuted several vigorous campaigns against the natives. In 1856 he was elected



Marthinus Pretorius, Boer leader

president of the newly founded South African Republic, which remained little more than a name for eight years. His policy of conciliation with the British diggers, who had flocked to the Transvaal on the discovery of diamonds in 1870, created such unpopularity with the Boers that he resigned in 1871. In 1880 he was associated with Kruger and Joubert in the Boer revolt against British annexation, retiring on the election of Kruger to the presidency, May, 1883. Pretorius died May 19, 1901.

Pretymán, ERNEST GEORGE (b. 1860). British soldier and politician. Born Nov. 13, 1860, he was educated at Eton, and was gazetted to the R.A. in 1880. Retiring from the army in 1889, he entered politics, was Conservative M.P. for Woodbridge, 1895-1906, and was elected for the Chelmsford division of Essex in 1908. Civil lord of the Admiralty, 1900-3, and secretary 1903-6, he was again civil lord 1916-19.



E. G. Pretymán, British politician

Preventive Service. In the United Kingdom the name of a former branch of the coast defence service. The preventive service came into existence after the end of the Napoleonic wars, to suppress smuggling on the S. coast of England, particularly in Kent and Sussex. Two naval vessels, the *Ramillies* and *Hyperion*, were commissioned, chiefly with half-pay naval lieutenants, but the officers were actually stationed at various points along the coast with the necessary men and boats. By 1830 the service had expanded to include many vessels up to 200 tons, revenue cutters, etc., and in 1845 men who joined the preventive service were required to sign on to serve in the navy in case of emergency. After 1857 the service became the coast-guard service, and eventually passed under the Admiralty. See *Coastguard*.

Prevesa. Town of Greece. Situated at the entrance of the gulf of Arta, it has a considerable shipping trade, and exports olives

and olive oil. The ruins of Nikopolis, founded by Augustus to commemorate the battle of Actium, lie 4 m. N. of the town. Pop. 6,000, mostly Greeks.

Prévost, EUGÈNE MARCEL (b. 1862). French novelist. He was born in Paris, May 1, 1862, and



Prévost

worked as engineer in a Lille factory until 1891, by which time he had already attained considerable popularity with his stories. His novels, which followed one another in rapid succession, include *Le Scorpion*, 1887; *Chonchette*, 1888; *Demoiselle Jaufré*, 1889; *La Cousine Laura*, 1890; *Lettres de Femmes*, 1892, followed by *Nouvelles Lettres*, 1894, and *Dernières Lettres*, 1897; *Les Demi-Vierges*, 1894; *L'Heureux Ménage*, 1901; *Monsieur et Madame Moloch*, 1906; and *Lettres à Françoise Mariée*, 1908. His play, *La Plus Faible*, produced at the Comédie Française in 1904, enjoyed great success. In 1909 he was elected to the French Academy. See *French Novelists of To-day*, W. Stephens, 1915. *Pron.* Pray-vô.

Prévost d'Exiles, ANTOINE FRANÇOIS (1697-1763). French abbé and author. He was born at Hesdin, Artois, April 1, 1697, and educated by the Jesuits, and saw some military service before joining the Benedictine order in 1721. In 1728, following a period of exile in Holland and England, he published his first novel *Mémoires d'un Homme de Qualité*, of which the enchanting *Manon Lescaut*, 1733, was a sequel. He spent most of the rest of his life near Chantilly, writing industriously, but none of his numerous other works is remembered. He died Nov. 23, 1763. His works were published in 39 volumes in 1806, and an English translation of *Manon Lescaut*, with *Life of Prévost*, in 1841. See *L'Abbé Prévost*, H. Harrisse, 1896. *Pron.* Pray-vô deg-zeel.

Prey (Lat., *praeda*, booty). Literally, something taken by force, plunder or booty. Beasts of prey are those that devour other animals, and birds of prey also live

on other living things. Such are lions and tigers, eagles, vultures, and hawks. See *Bird*; *Eagle*; *Hawk*; *Vulture*, etc.

Priam. In Greek mythology, king of Troy, son of Laomedon and father of Hector, Paris, Polyxena,



Priam, the aged king of Troy, being slain by Neoptolemus at the fall of Troy. From a vase painting after Polygnotus

Cassandra, and many other children. He was popularly credited with fifty sons and daughters. He was the only one of the sons of Laomedon that was spared when Hercules came to take vengeance for being cheated out of his reward for saving Hesione (q.v.) from the sea-monster. When Hector had been killed by Achilles, Priam, in a pathetic and powerful scene in the *Iliad*, visits the conqueror in the night-time to beg for the body of his son. At the taking of Troy, Priam was killed by Neoptolemus, or Pyrrhus, the son of Achilles. See *Homer*; *Troy*.

Priäpus. In Greek mythology, god of the reproductive powers of nature, and patron of gardens. He was the son of Dionysus and Aphrodite, and was especially worshipped at Lampascus on the Hellespont. His worship often degenerated into sheer licentiousness. Statues of Priäpus were to be found in gardens.

Pribilof Islands. Group of small islands in Bering Sea. Situated about 200 m. S.W. of the Alaskan mainland, they are an important centre of the fur-seal fisheries, and were constituted a reservation in 1868. The islands, of volcanic formation, were first visited in 1786 by Gerasim Pribilof, after whom they were named. They were acquired by the U.S.A. from Russia in 1867. See *Bering Sea Question*.

Pribram. Town of the republic of Czecho-Slovakia, in Bohemia. It is 18 m. S. of Beraun, and is famous for its silver-lead mines. On the Sacred Mount (1,903 ft.) are the Redemptorist Convent and a church, much visited by pilgrims. Pop. 13,000.

Price. Shortly defined, the money expression of value by the seller of an article. Usually an article is not priced unless held for sale, although the contrary may be true: thus an article—say, a picture or a house—may be on offer for sale without a price being quoted. The price becomes then a matter of bargain. More elaborately, price is the equivalent of the sacrifices made by the seller in production of an article estimated in some acknowledged medium of exchange.

In regard to articles, frequently produced and capable of reproduction, it closely approximates to cost of production. It is not the same as value, which is the equivalent measured generally in the form of currency, of the sacrifices which the would-be buyer is willing to make to possess an object. The two opposing psychological expressions become equal at the time of a sale when a price finds an equivalent in value, and is properly then called market-price. It is not infrequent for articles at quoted prices not to find buyers, when the only remedy is to lower prices to meet the standard of buyers, or to wait for an increase in demand which will bring higher values. Supply is an aggregate of goods offered at certain prices. Demand is an aggregate of values. *See* Value; Wealth.

Price, BONAMY (1807–88). British economist. Born at St. Peter Port, Guernsey, May 22, 1807, he was educated at Worcester College, Oxford, of which he became a fellow. From 1830–50 he was a master at Rugby, during which time he began the study of political economy, which he continued after settling in London. In 1868 he was elected professor of political economy at Oxford. He died Jan. 8, 1888. Price wrote *The Principles of Currency*, 1869, and *Chapters on Practical Political Economy*, 1878.

Price, RICHARD (1723–91). British economist and philosopher. Born at Tynton, Glamorganshire, Feb. 23, 1723, he was educated in London. His father was a dissenting minister, and he himself followed for a time that calling. Soon, however, he became known as a writer. In one pamphlet he urged the re-establishment of a sinking fund to repay the national debt, but it was his writings against the war with the American colonists, to which Burke replied, that made him famous. As a philosopher, he dealt mainly with ethics, his chief work being a *Review of the Principal Questions in Morals*, 1757. He also wrote *An Essay on Population*. Price, who died April 19, 1791, was intimate with Franklin.

Prichard, JAMES COWLES (1786–1848). British physician and ethnologist. Born at Ross, Herefordshire, Feb. 11, 1786, of Quaker parentage, he studied medicine in London, became M.D. Edin., 1808, then studied at Cambridge and Oxford, and began to practise in Bristol, 1810. His *Physical History of Mankind*, 1813, culminating in his *Natural History of Man*, 1843—both subsequently enlarged—inaugurated British anthropological research. He was elected F.R.S. and president of the Ethnological Society. His *Eastern Origin of the Celtic Nations*, 1831, was a landmark in Aryan study. A *Treatise on Insanity*, 1835, and *Forms of Insanity in Relation to Jurisprudence*, 1842, secured for him a commissionership in lunacy, 1845. He died in London, Dec. 22, 1848.

Prickly Heat. Affection of the skin occurring in tropical and sub-tropical regions, and occasionally in temperate zones during hot weather. The cause is unknown, but is probably the effect of heat on the sweat glands. An eruption of small papules occurs on the skin, associated with severe itching and profuse sweating. The condition generally disappears quickly under proper treatment. The patient should be kept cool, should not drink much, and should avoid hot tea. Sea bathing is undesirable. A lotion or powder containing boracic acid may be applied to the skin.

Prickly Heath (*Pernettya mucronata*). Evergreen shrub of the natural order Ericaceae. A native



Prickly Heath. Spray with leaves, flowers, and, right, berries. Inset, single flower

of Patagonia, it has stiff oval leaves with toothed edges, and urn-shaped, nodding white flowers. The fruit is a globular berry, about the size of a pea.

Prickly Pear (*Opuntia vulgaris*). Succulent shrub of the natural order Cactaceae. It is a native of the warmer parts of America. A jointed, prostrate, or spreading plant, the light green joints are of oval shape, and the



Prickly Pear. Cactus of tropical America, *Opuntia microdasys*

leaves reduced to minute scales. The spines are small, solitary, or absent, though there are clusters of barbed bristles. The flowers are pale yellow, opening only in sunshine, and are succeeded by smooth pulpy, edible, egg-shaped fruits. *O. lutea* is a larger species, more spiny, with larger fruit (West Indies); and *O. ficus-indica* (Mexico) furnishes the so-called Indian figs.

Prick-Song. Term formerly used for music which was written down, prick, in the sense of a mark, being an old name for a musical note. The term was also applied to divisions upon a ground, and to descant upon plainsong.

Pride, THOMAS (d. 1658). English regicide. He was a brewer in early life, but on the outbreak of the Civil War joined the Parliamentary army and won rapid promotion. In 1645 he distinguished himself in command of a regiment at the battle of Naseby. On Dec. 6, 1648, to prevent the Parliament from coming to an agreement with the king, Colonel Pride, with a body of soldiers, forcibly prevented about 140 members from taking their seats, arresting over 40 of them. This episode is known as Pride's Purge. At the beginning of the following year he was one of the commissioners at the trial of Charles I, and signed the death warrant. He died Oct. 23, 1658. *See* Lives of the English Regicides, M. Noble, 1798.

Pride and Prejudice. Novel by Jane Austen, published anonymously in 1813. It was the first of her novels to be written, though the second to be published. In it the author's happy, seemingly easy method of characterisation is seen at its best, while her admirable command of natural dialogue and playful, radiant humour combine to make the book attractive.

Prideaux, HUMPHREY (1648–1724). British Orientalist and divine. He was born May 3, 1648,

at Padstow, Cornwall, and educated at Liskeard and Bodmin grammar schools, at Westminster, and at Christ Church, Oxford, where he was distinguished for his scholarship. In 1681 he became canon of Norwich, and from 1688-94 was archdeacon of Suffolk. He succeeded Fairfax as dean of Norwich in 1702, died there, Nov. 1, 1724, and is buried in the cathedral. Among his works are *Life of Mahomet*, 1697; and *The Connection*, 1716-18.

Prie-Dieu (Fr., pray God). Small wooden desk for prayers. It has a cushioned kneeling-piece and a sloping shelf for books. The name came into use in the early 17th century. See *Faldstool*.

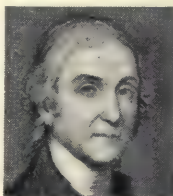
Priego de Córdoba. Town of Spain, in the prov. of Córdoba. It stands in a fertile plain, 47 m. S.E. of Córdoba, and has a 13th century church. Industries include tanning and the manufacture of cotton and silken goods, rugs, and esparto fabrics, while a thriving trade is carried on in oil, wine, cattle, horses, and mules, for which the district is noted. A Moorish stronghold, it was captured by the Christians in 1226, retaken by the Moors, and finally reconquered in 1407. Pop. 17,000.

Priessnitz, VINCENTZ (1799-1851). German hydropathist. Born at Gräfenberg, Silesia, Oct. 5, 1799, he became a farmer. Having obtained the idea of the water cure for illness, he practised it on his animals and then on himself. So successful was he that he extended his farm buildings to form a hydropathic establishment, the precursor of many others. He died Nov. 28, 1851. The system of Priessnitz consisted essentially in the application of cold water to all parts of the body by bandages and other devices, supplemented by careful diet, exercise, and fresh air.

Priest (Gr. *presbyteros*, elder). Term for a member of the second order of the Christian ministry. The original signification of the word, which is used in connexion with officiating ministers in pagan temples as well as in Christian churches, though not in the Free churches, is doubtful; but it is used by the English translators of the O.T. as an equivalent of the Hebrew *cohen*, which implies one who stands as mediator between his fellow-men and God. In the N.T. the translators also use the word priest as an equivalent of the Greek *hiereus* (Lat. *sacerdos*), sacrificing priest. Though in common use at the beginning of the 3rd century, the word priest (*hiereus*) is not applied in the N.T. to a Christian minister as distinct from the

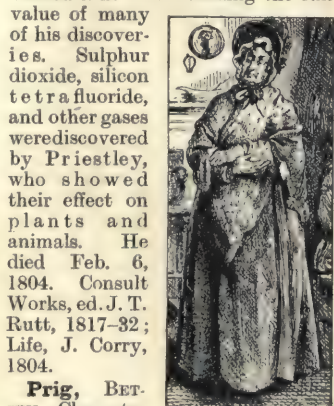
Christian people. It occurs, however, in reference to Jewish priests, to the priest of Jupiter at Lystra (Acts xiv, 13), and to our Lord (Heb. vii, 16-17; viii, 4). See *Clergy*; *High Priest*; *Holy Orders*; *Minister*; *Sacerdotalism*.

Priestley, JOSEPH (1733-1804). British chemist. Born at Birstall, Yorkshire, March 13, 1733, he was educated for the Nonconformist ministry. In 1755 he became minister of a church at Needham, removing to Leeds in 1767 and to Birmingham in 1780. During all his life he held theological views which were in advance of the time,



J. Priestley

but it is as a scientist that Priestley is remembered. He early took an interest in chemistry and electricity, and in 1767 published his *History of Electricity*. He carried out many brilliant experiments with electricity from 1761-70, suggesting explanations of certain phenomena which required a century to pass for final proof. He turned his attention to chemistry in 1770; in 1772 he read his paper on *Different Kinds of Air*, in which he announced the discovery of hydrochloric acid and nitric oxide. This paper contained a suggestion for saturating water with carbonic acid, a suggestion which led to a new industry, the manufacture of mineral waters. His remarkable discovery of oxygen in 1774 followed, one of the landmarks in the history of chemistry. Priestley was a strong advocate of the phlogiston theory, and this prevented him from realizing the full value of many of his discoveries. Sulphur dioxide, silicon tetrafluoride, and other gases were discovered by Priestley, who showed their effect on plants and animals. He died Feb. 6, 1804. Consult *Works*, ed. J. T. Rutt, 1817-32; *Life*, J. Corry, 1804.



Prig, BETSEY. Character in Dickens's novel *Martin*

Chuzzlewit. From a drawing by Fred Barnard

Chuzzlewit. An ignorant and brutal monthly nurse, she is the friend and frequent partner of Sairey Gamp (*q.v.*), sharing her weakness for strong spirits, and distinguished from her by the possession of a beard.

Prilip. Town of Yugo-Slavia. It is 25 m. N.E. of Monastir, on a tributary of the Crna river. It figured prominently in the Great War, being captured by the Bulgarians on Nov. 16, 1915, and regained by the Allies on Sept. 23, 1918, after the Serbians had cut the vital Gradsko-Prilip rly. on the previous day. See *Serbia*, *Conquest of*.

Priluki. Town of S.W. Russia. It is 25 m. N.E. of Monastir, on a tributary of the Crna river. It figured prominently in the Great War, being captured by the Bulgarians on Nov. 16, 1915, and regained by the Allies on Sept. 23, 1918, after the Serbians had cut the vital Gradsko-Prilip rly. on the previous day. See *Serbia*, *Conquest of*.

Prim, JUAN, MARQUIS DE LOS CASTILLEJOS, COUNT DE REUS (1814-70). Spanish soldier. Born



Juan Prim,
Spanish soldier

Dec. 12, 1814, he spent his youth under arms, but was exiled by Espartero in 1839. Four years later he was instrumental in causing the minister's downfall, but was himself exiled shortly after, living in England and France until his return to Spain in 1847. His military services, 1847-60, were rewarded with a marquessate, but in 1868, angered at Queen Isabella's favouritism to the Jesuits, he and Serrano led an insurrection, the latter being declared regent. On the election of Amadeo, duke of Aosta, to the Spanish throne, Prim was assassinated, Dec. 28, 1870.

Primage (Lat. *premium*, reward). Term used in shipping for an allowance made by the shipper to the captain of the vessel for the use of the tackle, etc., in loading and unloading cargo. Now used simply for any addition to the quoted rate of freight, usually to repay the captain for his care, its amount varies from port to port and also in different trades.

Primate (Lat. *primus*, first). In England, term applied to the archbishops of Canterbury and York. It means the bishop highest in rank in a nation or province. In the R.C. church primates are bishops to whose see was the dignity of vicar of the Holy See was formerly attached, these including Armagh, Arles,

Lyons, Mainz, Toledo, Gran, Pisa, and Salerno. See Archbishop; Canterbury; Exarch; Metropolitan.

Primates (Lat., *primus*, first). Highest order of the mammalia. It is divided into two sections, the Lemuroidea, which include the lemurs and their relatives, and the Anthropeidea, which include the monkeys, apes, and man. These two sections are regarded as distinct orders by some authorities. With the single exception of man, all the members of this order are inhabitants of tropical and sub-tropical countries, and are arboreal in habit, though some baboons are more usually found among rocks than in trees. Hence they are essentially climbing animals, and the four feet are adapted for grasping, thus the old name of quadrumana or four-handed animals.

Except in man, the great toe is opposable to the others, but the thumb is often imperfectly so. The upper halves of the limbs are free from the body and not embedded in it, as in the ungulates and others. The fingers and toes do not taper to a point, but are more or less broad at the tip and bear a nail instead of a claw. Another notable distinction is that the eyes are brought round to the front of the head, and not placed at the sides. The mammae or teats are normally only two in number and are situated on the breast, and never on the abdomen. In the higher primates, a more or less erect attitude has been adopted; and in man the brain has been greatly developed both in size and in elaboration of structure. The dentition differs essentially from that of both carnivores and herbivores, and is indicative of a mixed diet. See Animal; Mammal.

Prime Meridian. Zero longitude from which all meridians are reckoned or numbered E. and W., in the majority of maps the meridian of Greenwich. The choice of a prime meridian is determined by its utility. See Longitude.

Prime Minister. Head of the British Government and the principal adviser of the sovereign, called also the premier. He must be a member of Parliament and enjoy the confidence of a majority of the House of Commons, and through them that of the country. Under the party system, he is also the leader of his own party. His powers are enormous, as he selects the cabinet, advises the sovereign when to dissolve parliament, and exercises patronage.

Sir Robert Walpole is generally regarded as the first prime minister, and since his time the power and prestige attached to the office have

steadily increased. In the constitution the position of prime minister was unknown, and the holder, therefore, always held, in addition, some other office, usually, but not always, that of first lord of the treasury. In 1905, however, King Edward VII recognized the existence of the position, and gave the prime minister precedence on state occasions, immediately after the archbishop of York. At present there is a tendency for the prime minister to perform a dual rôle, to be the head of the government, one representing only one party or a coalition of parties, and, apart from this, to be the adviser of the sovereign in his relations with the self-governing Dominions. Canada, Australia, South Africa, New Zealand, etc., have a prime minister.

PRIME MINISTERS SINCE 1721

- 1721-42 Sir Robert Walpole.
- 1742-44 Lord Carteret, aft. Earl Granville.
- 1744-54 Henry Pelham.
- 1754-56 Duke of Newcastle.
- 1756-62 William Pitt and Duke of Newcastle.
- 1762-63 Earl of Bute.
- 1763-65 George Grenville.
- 1765-66 Marquess of Rockingham.
- 1766-67 William Pitt, Earl of Chatham.
- 1767-70 Duke of Grafton.
- 1770-82 Lord North, aft. Earl of Guilford.
- 1782 Marquess of Rockingham (2nd time).
- 1782-83 Earl of Shelburne, aft. Marquess of Lansdowne.
- 1783 Lord North, aft. Earl of Guilford (2nd time).
- 1783-1801 William Pitt.
- 1801-4 Henry Addington, aft. Viscount Sidmouth.
- 1804-6 William Pitt (2nd time).
- 1806-7 Lord Grenville.
- 1807-9 Duke of Portland.
- 1809-12 Spencer Perceval.
- 1812-27 Earl of Liverpool.
- 1827 George Canning.
- 1827-28 Viscount Goderich, aft. Earl of Epsom.
- 1828-30 Duke of Wellington.
- 1830-34 Earl Grey.
- 1834 Viscount Melbourne.
- 1834-35 Sir Robert Peel.
- 1835-41 Viscount Melbourne (2nd time).
- 1841-46 Sir Robert Peel (2nd time).
- 1846-52 Lord Russell, aft. Earl Russell.
- 1852 Earl of Derby.
- 1852-55 Earl of Aberdeen.
- 1855-59 Viscount Palmerston.
- 1859-59 Earl of Derby (2nd time).
- 1859-65 Viscount Palmerston (2nd time).
- 1865-66 Earl Russell (2nd time).
- 1866-68 Earl of Derby (3rd time).
- 1868 Benjamin Disraeli, aft. Earl of Beaconsfield.
- 1868-74 W. E. Gladstone.
- 1874-80 Earl of Beaconsfield (2nd time).
- 1880-85 W. E. Gladstone (2nd time).
- 1885-86 Marquess of Salisbury.
- 1886 W. E. Gladstone (3rd time).
- 1886-92 Marquess of Salisbury (2nd time).
- 1892-94 W. E. Gladstone (4th time).
- 1894-95 Earl of Rosebery.
- 1895-1902 Marquess of Salisbury (3rd time).
- 1902-5 Arthur J. Balfour.
- 1905-8 Sir H. Campbell-Bannerman.
- 1905-15 H. H. Asquith.
- 1910-22 David Lloyd George.
- 1922-23 Andrew Bonar Law.
- 1923-24 Stanley Baldwin.
- 1924 J. Ramsay MacDonald.
- 1924-Stanley Baldwin (2nd time).

It will be seen that Walpole was continuously prime minister for a longer period—21 years—than any one else. The younger Pitt was premier for 18 years, and Lord Liverpool for 15 years continuously. No one save Gladstone has held office four times. See The Government of England, S. J. Low, 1904.

Primer. Term employed to describe the intermediate or prim-

ary member of the train of devices employed to initiate detonation or ignition in explosives and propellants. Modern high explosives become so insensitive when in the dense state that they cannot be relied upon completely to detonate from the direct impulse of a fulminate detonator, and it is therefore usual to interpose between the latter and the main charge a small quantity of either the same high explosive in a loose state or a more sensitive one, this intermediate charge being termed a primer, or, in America, a "booster." (See Ammunition; Cartridge; Explorer; Explosives; Ordnance.)

The word is also used for a small elementary book for children to read and hence for any small book dealing with elementary principles, e.g. a primer of grammar.

Prime Vertical. Name given to the great meridian circle of the celestial sphere. It passes through the E. and W. points of the horizon and the zenith (*q.v.*).

Priming. In oil painting, the coating of a canvas or panel with size, so as to form a ground for the colours. The Van Eycks used a pure white gesso ground, but later priming mixtures formed of white lead, various oils, and earths were light grey or even brightly tinted. Opinions differ as to how far the colour of the ground affects the brilliancy of the picture, but it is usually held to correct the darkening of the oil which takes place after a time. See Painting.

Primitive Methodists. Body of Methodists. They arose as the result of difference of opinion on the subject of camp meetings, a species of open-air revival services which were long popular in America, especially among the negroes. In the opening years of the 19th century they were introduced into Staffordshire by an American Methodist named Lorenzo Dow, the first camp meeting being held in 1807 and speedily followed by others.

Conspicuous among the organizers and leaders was Hugh James Bourne, a Methodist local preacher, who was joined by several energetic preachers of like mind. They founded a new denomination, which soon included 16 congregations and 28 preachers in Lancashire and Cheshire. The name Primitive Methodist indicated that the new body sought to revive the primitive fervour of the early Methodists under Wesley.

The new connexion grew with remarkable rapidity, and within 30 years numbered 36,000 adherents—more than the original

Methodists had numbered after 30 years of Wesley's preaching and organizing. Within 30 years it had spread over Great Britain and had sent its agents to the U.S.A. and Canada. For many years it had to face keen persecution, at the hands both of the Wesleyans and others, and in many cases its preachers were imprisoned. In 1844 it first extended its work to the foreign field, and in 1870 its African mission was started. After the death of Hugh Bourne, in 1852, the connexion was reorganized and was for some years administered in seven districts; but it was not until 1902 that the body unified and consolidated its system of government.

The official statistics of the denomination for 1923 show a membership of 210,923, with 1,091 ministers and 13,939 local preachers. The chapels number 4,405, and there are 419,632 Sunday scholars. *See* Methodism; Wesleyan Methodist.

Primogeniture (Lat. *primus*, first; *genitus*, begotten). Seniority by birth, and, by extension, the system under which the eldest son succeeds to the entire real estate of a father dying intestate, to the exclusion of all the other children. This right of primogeniture in males existed among the Jews, but not among other ancient peoples, nearly all of whom divided the lands equally, some among all the children, some among the males only. It was not part of the Roman law, and was abolished in the U.K. by the Law of Property Act (*q.v.*)

It originated in the feudal system, when the honorary feuds, or titles of nobility, created were of necessity made indivisible and inheritable by the eldest son only. The inconveniences resulting from the division of estates, by the consequent division of military services, next led to the establishment of a custom whereby the eldest son inherited the whole of the lands held by his father in military tenure. This rule of inheritance was introduced into England by William the Conqueror. It still remained part of the English constitution that socage fees were divisible among all the male children, though knight's fees descended to the eldest son. By the time of Henry III, however, socage lands also had almost entirely fallen into the right of succession by primogeniture, except in certain parts, such as Kent, where the ancient gavel-kind tenure was jealously preserved, and in some manors and townships, where succession was still determined by local custom.

With regard to females, succession by primogeniture only exists in respect to inheritance of the crown. In respect of female dignities and titles of honour the right of succession, but not of primogeniture, is established. Thus, if a man holds an earldom to himself and the heirs of his body, and dies leaving daughters only, the eldest does not become countess as a matter of course, but the dignity falls into abeyance until the sovereign, as the fountain of honour, confers it upon which of the daughters he pleases. *See* Family; Genealogy; Peerage.

Primorskaya. Easterly province of Siberia known as the Littoral or Maritime Province (*q.v.*).

Primrose (*Primula vulgaris*). Perennial woodland herb of the natural order Primulaceae. It is a



Primrose. *Primula vulgaris*, flowering in British woods in spring

native of Europe and N. Africa, and grows profusely in Britain. From the thick, fleshy rootstock the wrinkled and almost stalkless leaves rise in a circle. The long-stalked flowers which appear in April really form an umbel, as in cowslip, but the common flowering stem is suppressed and concealed between the leaves. The funnel-shaped flowers are of a very pale-yellow tint, and of two forms: in one form there is a long style bringing the round stigma to the mouth of the flower-tube, with the stamens half-way down; and in the other the style reaches only half-way up, whilst the stamens partly fill the mouth. This arrangement secures cross-pollination, the long tongue of the bee-fly (*Bombylus*)—the chief pollinating agent—having to touch both these points in its search for the nectar that lies at the bottom. Pollen is carried from the anthers of the long-styled to the stigma of the short-styled, and vice versa. *See* Flower; Pollination; Primulaceae.

Primrose, NEIL JAMES ARCHIBALD (1882–1917). British politician and soldier. He was born Dec. 14, 1882,



Neil Primrose, British politician

2nd son of the earl of Rosebery, and educated at Eton and New College, Oxford. As Liberal member for the Wisbech div. of Cambridgeshire from 1910, he

made his mark as a rising hope of his party, strongly criticising the cabinet's Ulster policy in 1914. In the Great War, Primrose served in the Yeomanry, and then acted as under-secretary for foreign affairs, Feb.–May, 1915, returning to military duties until appointed parliamentary military secretary to the ministry of munitions shortly before the fall of the Asquith cabinet, Dec., 1916. Chief whip, Dec., 1916, he returned to the Yeomanry soon afterwards, and was killed in action in Palestine, Nov. 18, 1917. *See* Rosebery, Earl of.

Primrose Family, THE. Family of the Vicar of Wakefield in Goldsmith's story of that name. The vicar himself, the narrator of the story, is by nature an admirer of human happy faces, and a firm upholder of the belief that it is unlawful for a clergyman of the Church of England to marry twice. In addition to Deborah Primrose, his wife, a good-natured, notable woman—for pickling, preserving, and cookery none could excel her—the characters include George, their eldest son; Olivia, open, sprightly, and commanding—victimised by Squire Thornhill; Sophia, soft, modest, and alluring—who wins Sir William Thornhill, alias Mr. Burchell; Moses, the lad who, being sent to sell a horse, buys a gross of green spectacles, and two much younger boys, Dick and Bill. The young Primroses are summed up by their father as being all of an equally generous, credulous, simple, and inoffensive nature. *See* Goldsmith, Oliver; Olivia

Primrose Hill and Park. London eminence and open space. Adjoining St. John's Wood and Regent's Park, and covering about 50 acres, the park, with adjoining property now largely built upon, passed from the leper hospital of St. James to Eton College, and was in the early part of Queen Victoria's reign handed over to the government in exchange for lands at Eton. On the summit of the hill, 206 ft., which commands one of the finest views in London, is a dial indicating the direction and distances of the chief landmarks of the city. At the base of the hill, which preceded Hyde Park as a

place of popular assembly, is an open-air gymnasium. The body of Sir Edmund Godfrey (q.v.) was found at Primrose Hill after his murder at Somerset House in 1678. Mother Shipton prophesied that the hill would one day be the centre of London.

Primrose League. British political organization. It was formed by a number of Conservatives, at the suggestion of Sir H. Drummond Wolff, in 1883, Lord Randolph Churchill being among them. Their aim was to spread the principles of Conservatism among the working classes, and the name was that of the favourite flower of the earl of Beaconsfield.

An elaborate organization was set up. Officials are known as knights and dames, and the members are grouped in habitations. The league was open to both men and women, and women have been prominent in its work, much of which is of a social character, from the first. In 1885 a separate grand council was formed for them. The members promise to maintain religion, the estates of the realm, and the imperial ascendancy of Great Britain. The badge is a monogram of the letters P.L., surrounded by primroses, the motto Imperium et Libertas, and the seal three primroses. The headquarters are at 64, Victoria St., London, S.W. See Conservative; Unionist.

Primrose day is the name given to April 19, the day of Lord Beaconsfield's death. Primroses are worn and his statue in Parliament Square is decorated, while the Primrose League marks the day in a variety of ways.

Primula (Lat. *primus*, first). Genus comprising about 150 perennial herbs of the natural order Primulaceae (q.v.), chiefly natives of hilly districts in the N. temperate regions. Five species are natives of Britain: primrose (*P. vulgaris*), cowslip (*P. veris*), oxlip (*P. elatior*), bird's-eye (*P. farinosa*), and Scottish primrose (*P. scotica*). The garden polyanthus is believed to be a hybrid between the cowslip and primrose. Many hardy exotic species are in general cultivation, especially in rock gardens.

The auricula (*P. auricula*) was introduced from the European Alps as far back as 1596. *P. japonica*, perhaps the most beautiful of the hardy species, which succeeds in moist rich loam, has a stem from 1 ft. to 2 ft. high, on which the white, pink, crimson, or maroon flowers are produced in several whorls. Siebold's primrose, also from Japan, is another fine plant, with rosy flowers in umbels. Among the greenhouse favourites

are the Chinese primrose (*P. sinensis*), with variable lilac flowers, and *P. obconica*, also from China, has drooping purplish flowers. This species must be handled with care, as contact with its hairy leaves



Primula. Flowers of *P. obconica*, a greenhouse favourite

produces a troublesome rash on delicate skins. Seeds of all the kinds should be sown as soon as ripe, in shallow pans of leaf-mould, covered with a sheet of glass and placed in the shade.

Primulaceae OR PRIMROSE FAMILY. Natural order of herbs (mostly perennials). Including about 350 species, they are natives chiefly of the N. temperate regions, being but slightly represented in the S. and the tropics. The flowers are in most cases regular, showy, and sweet-scented; more or less tubular, with spreading limb. The fruit is a single-celled capsule. Well-known genera are *Primula*, *Anagallis*, *Lysimachia*, and *Cyclamen*.

Primuline. Yellow aniline dye discovered by A. G. Green in 1887 and used for dyeing cotton. See Aniline Dyes.

Primum Mobile (Lat., first source of motion). In ancient astronomy, the tenth or outer sphere of the universe in the Ptolemaic System (q.v.). Pron. Mo-bil-ee.

Primus (Lat., first). Term applied to the bishop elected to preside over the synod of the Episcopal Church of Scotland.

Prince (Lat. *princeps*, first). Title of dignity. In Great Britain it is used only for members of the royal family. The eldest son of the sovereign is created prince of Wales, the eldest daughter is the princess royal, and the younger children are princes and princesses.

The title, which was first used in Italy, had, before the Great War, a wider application in Germany and other Continental countries than it had in Britain. In the medieval empire it was given at first to all the great feudatories of the emperor. Later it was reserved to those who had seats in the college of princes, some being lay-

men and others being prelates. The emperors gave the title to other subjects, and after the dissolution of the empire in 1806 a few of these princes remained as rulers of the little German states until the changes of 1918. One of them was the prince of Reuss. The rulers of Germany and Austria also raised subjects to the rank of prince, examples being Bismarck and Metternich. In France, under the Bourbons, the title was given to members of the royal family. It is still used in Italy, Spain and other monarchical countries, and in a general sense for a ruler. The German equivalent is Fürst.

Prince, THE (Ital. *Il Principe*). Political treatise by Machiavelli (q.v.). It was published in Italian and has been translated into English and most modern languages. It outlines the way in which a prince should act, if he wishes to preserve and strengthen his inheritance. The lessons are pressed home with a wealth of illustrations taken from the history of Italy in Machiavelli's own time and of the ancient world. The book is one of the greatest of its kind, for Machiavelli was the first writer to apply the inductive or experimental method to politics, and to break with the theories laid down by the Church. This constitutes its main value, and establishes Machiavelli as the thinker who laid down the conditions of the modern state.

Prince Albert. City of Saskatchewan, Canada. It stands on the North Saskatchewan river, is an important junction on the C.N.R., and is also served by the G.T.R. Industries include brickyards and flour mills, and those connected with lumber. Pop. 14,000.

Prince Albert Peninsula. N.W. projection of Victoria Island, Arctic America. It lies N. of Prince Albert Sound, S. of Banks Strait, and is separated from Banks Land by the Prince of Wales Strait. The coast is indented by Minto Inlet, Collinson Inlet, and Glenelg Bay. Its most N. point is Peel Pt.

Prince Edward Island. Island in the Gulf of St. Lawrence, and the smallest province of the



Prince Edward Island arms

Dominion of Canada. The coast is deeply indented, and Northumberland Strait divides it from the mainland. Its area is 2,184 sq. m., and pop. 93,700. Wheat, oats, potatoes, etc., are grown; butter and cheese are made; cattle and horses are reared; and foxes are

of which the largest is N. Kennedy river. In the N. of Cooktown land dist., it has no harbours, being N. of the settled area.

Princess Ida. Comic opera written by W. S. Gilbert, composed by Arthur Sullivan, and produced, Jan. 5, 1884, at The Savoy, where it attained a run of 246 performances. Rutland Barrington, George Grossmith, Henry Bracey, Durward Lely, Richard Temple, Rosina Brandram, Jessie Bond, and Leonora Braham were members of the original cast.

Princess's Theatre. Former London playhouse. It was at No. 73, later No. 152, Oxford Street. Built originally as a bazaar, the Queen's Bazaar, it was opened as a theatre in 1841, rebuilt and reopened in 1880, and, after being closed for a number of years, was announced in Oct., 1921, for conversion into business premises. Charles Kean and Wilson Barrett achieved some of their greatest successes here, and it was at this theatre that Ellen Terry made her first appearance on the stage, April 28, 1856, as Mamillius, in A Winter's Tale.

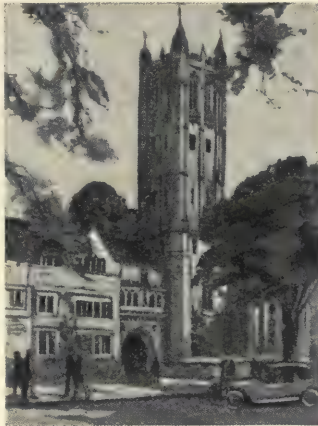
Prince Steamship Line. British steamship company. Founded in Newcastle-upon-Tyne, 1883, its vessels all bear a second name of Prince, e.g. Spanish Prince. Regular services are maintained between Manchester and N. African ports; Tyne, Antwerp, and London and N. African ports, also to S. America. Vessels of this line also ply between New York and S. America, S. Africa and the Far East.

Princes Theatre. London playhouse in Shaftesbury Avenue, W. First known as The New Prince's, it was opened by W. F. Melville, Dec. 26, 1911, with The Three Musketeers. There was a notable revival of the Gilbert and Sullivan operas here in 1921.

Princeton. City of Indiana, U.S.A., the co. seat of Gibson co. Situated 28 m. N. of Evansville, and served by the Chicago and Eastern Illinois rly., it stands in an oil and gas region, and has rly. workshops, flour mills, brick works, and carriage works. Pop. 7,100.

Princeton. Bor. of New Jersey, U.S.A., in Mercer co. It is 10 m. N.N.E. of Trenton, and is served by the Pennsylvania Rly. and the Delaware and Raritan canal. The seat of Princeton University, it has also the Princeton Theological Seminary, S. Joseph's College, and the Rockefeller Medical Research Institute. Princeton was the scene in 1777 of a success by Washington over a British force. Congress sat here temporarily in 1783. Pop. 5,900.

Princeton University. University of the U.S.A., situated at Princeton, New Jersey. It was founded as the College of New



Princeton University. Holder Tower and Hall

Jersey, in 1746, at Elizabethtown, moved to Newark, 1748, and to Princeton, 1756. The buildings suffered severely during the War of Independence, but steadily progressed throughout the 19th century. Nassau Hall was founded in 1756, and there are more than a dozen dormitory halls, together with museums, laboratories, stadium, etc. Princeton is one of America's foremost universities in scholarship and sport, and has a professorial staff of about 180. The number of students is about 1,800. Degrees of A.B., Litt.B., B.S., and C.E. are granted. See Wilson, Woodrow.

Princtown. Village of Devonshire, England. It stands on the W. side of Dartmoor, 22 m. from Plymouth, with a station on the G.W. Rly. The existence of the place is due to the prison opened here in 1809; but it is also a centre for visitors to the moor. See Dartmoor Prison.

Princip, GAVRILO (1895-1918). Assassin of the Archduke Ferdinand. Born in Grahovo, Bosnia, Princip, who fired the fatal shots at the Archduke Ferdinand and his wife at Sarajevo, on June 28, 1914, which precipitated the Great War, had been a student of Belgrade University. On interrogation he declared that he had for a long time decided to kill some eminent personage from Nationalist motives. Princip acted in concert with Chabrinovich, who threw the bomb which missed the royal pair, and it was suspected that the young men were the agents of persons engaged in a wider conspiracy. The trial in connexion with the murder took

place at Sarajevo. Princip and Chabrinovich were sentenced to twenty years' penal servitude, seven others to various extended terms, and a man named Mitar Kerovich to penal servitude for life. Princip died from tuberculosis at the fortress of Theresienstadt, near Prague, May 1, 1918.

Principal (Lat. *principes*, chief). In general, one who is chief and is entrusted with the lead. As a title, principal is often used for the head of colleges, seminaries, universities, etc., e.g. the heads of London, Birmingham, and other universities are principals. In building, the principal is an important beam or timber in a framework. In finance, the principal is a sum of money which, in an investment, produces interest or revenue.

In law, the principal is the person who commits a crime, whether the absolute perpetrator or the aider and abettor. Also, a person competent to do an act himself and employing another to do it for him is a principal, the other being an agent. A principal is liable to third parties in respect of all acts done by an agent, either upon express authority or instructions, or within the apparent scope of his authority. The maxim applicable is *Qui facit per alium, facit per se*, who acts by another, acts by himself.

Principal. Musical term with several connotations. (1) The name given in Great Britain to the 4-ft. diapason on the organ. In Germany principal designates all diapasons of 32-ft., 16-ft., 8 ft., 4 ft., and 2-ft. pitch. (2) Term used by Handel for a third trumpet of larger bore than the first and second trumpets. In old trumpet music, the lowest was called the principal. (3) The chief soloists in a concert, and the leaders of departments in the orchestra are termed principals.

Principe. Portuguese island in the Gulf of Biafra. It lies midway between the islands of Fernando Po (q.v.) and San Thomé (q.v.). The island is mountainous, and the climate unhealthy. The chief product is cocoa. Pop. 5,000.

Pringle, THOMAS (1789-1834). Scottish poet. Born at Blaiklaw, Teviotdale, Jan. 5, 1789, the son of a farmer, he was educated at Edinburgh University. With James Cleghorn, he edited the first number of the Edinburgh Monthly Magazine, which, after Pringle had severed his connexion, became Blackwood's Magazine. In 1820 he emigrated to Cape Colony, but his Whig politics got him into trouble, and in 1826 he was back in London as secretary of the Anti-Slavery Society, a post which he held till his death. His earlier

poems were issued in 1828, under the title *Ephemerides*, but his finest efforts are to be found in his *South African Sketches*, 1834, notably the well-known lyric, *The Emigrant's Farewell*. He died in London, Dec. 5, 1834.

Pringsheim, NATHANIEL (1823-94). German botanist. Born at Wziesko, near Landsberg, Silesia, Nov. 30, 1823, he was educated at Breslau, Leipzig, and Berlin universities, and in 1851 was appointed lecturer in natural science at Berlin University. He founded the *Year Book of Scientific Botany*, 1857, was professor of botany at Jena, 1864-68, and returning to Berlin occupied himself in research work. The German Botanical Society was founded by him in 1882. Author of many authoritative works on botany, he died in Berlin, Oct. 6, 1894.

Prinkipo. Turkish island in the Sea of Marmora. It is the largest island in the group of Princes' Islands (*q.v.*), and came into prominence in 1919 in connexion with a proposed conference between Soviet Russia and the Allies, but no meeting was held.

Prinsep, VALENTINE CAMERON (1838-1904). British artist. Born at Calcutta, Feb. 4, 1838, he studied



Val Prinsep,
British artist

under G. F. Watts in London, and Gleyre in Paris, where he was fellow student with Du Maurier. He is introduced into Du Maurier's *Trilby* as Taffy. One of the Oxford Union frescoists, he drifted away from pre-Raphaelitism under Leighton's influence. He became A.R.A. in 1878, and R.A. in 1894. He painted history and genre, wrote plays, and was an enthusiastic volunteer. He died at Kensington, Nov. 11, 1904.

Print. Impression on paper from an engraving on metal, stone, or wood. The chief varieties of engraving are etchings, mezzotints, line-engravings, stipple, aquatint, woodcuts, and lithographs, each of which will be found described under its title. Prints from engravings are classified as states, and vary with the condition of the engraving at the time of printing; the number of states also varies very greatly with individual engravers. Changes constituting a fresh state may take place in the subject, in the handling, or in the lettering, or in all three. Only prints, however, from a completed engraving are recognized as states.

The engraver, while he is at work, often takes a trial impression, called an engraver's progress proof, in order to estimate his progress. When he is satisfied that the work is finished, he proceeds—generally before lettering—with the first state. It is the first state impression that generally offers the greatest attraction to the collector. When a plate has been reworked for the sake of restoring etched or engraved lines that have lost their sharpness, the resulting

impressions do not reach the same excellence. Sometimes, however, as in some of Whistler's etchings, an alteration in the design, or in the balance of light and shade, may result in the second or third states being more satisfactory than the first. In 1847 the *Printsellers' Association* was formed in England, with the principal aim of preventing more than a definitely declared number of impressions of each state from being printed off.

PRINTING: HISTORY AND PRACTICE

Joseph Thorp, Author of *Printing for Business*

In connexion with this subject see the articles Colour Printing; Intaglio; Lithography; Offset, etc.; also Book; Journalism; Newspaper; Publishing; Stereotyping. See also Bible; Compositor; Galley; Proof Correction, etc., and the biographies of Caxton, Gutenberg, and other printers

It has long been accepted, though disputed by some, that prints from wooden blocks appeared in Europe in the 6th century from China; but certainly not until the time of Dutch wood-cutters of the 15th century was the idea of duplicating copies by a process of inking the raised surface of a block realized and exploited. It was an easy transition from the cutting of designs upon wood to the cutting of lettering also. The next step was the making of movable wooden types. The movable metal types cast from matrices or moulds appeared between 1440 and 1450.

It is a fair claim that printing is the most important single mechanical revolution in human history. Fortunately the invention of printing came at a time when calligraphy was at its best. Excellent models existed at the time both for the form of lettering (the early types were quite naturally modified imitations of the written script) and for the arrangement of the printed page. Nothing finer has been produced than the Gothic type "42 line" Bible of 1455, attributed to Gutenberg of Mainz, with its illuminated initials; and the modern renaissance of printing under the inspiration of William Morris and his companions goes back to this early period for its chief inspiration.

Of the great early printers, Peter Schöffer, also of Mainz, to whom the invention of cast type is attributed, and who introduced a more legible simplified Gothic type; Sweynheim and Pannartz, of Subiaco, whose type showed the transition from the Gothic to the Roman used first by Adolf Rusch, and who was known as the "R" printer from the peculiar shape of the capital R in his fount of type; and the Frenchman, Nicolas Jensen, working at Venice about 1470,

all deserve special recognition for their share in the development of the art and craft of printing. The Englishman, William Caxton, who possibly learned his printing at Cologne and certainly printed at Bruges, began work, near Westminster Abbey, in 1476-77, which was continued after his death by his foreman, Wynkyn de Worde. To Germany and, some way after, to Italy, in the 15th century, must be given the greatest share of credit.

In the early years of printing printed books were mainly large folios, following the practice of the majority of MS. books. As technical efficiency and production became cheaper, production increased; smaller books, purchasable by other than the rich, came into being, and by the 16th century the small book was no longer a rarity. There were but 12 English towns with presses in the 16th century to the 20 of Germany and the hundred of Italy. Early in the 16th century France took the lead; and afterwards the religious persecution in France drove some of the finest French printers, who in these early days were much identified with the cause of liberty and progress, into the neighbouring countries. Plantin (*q.v.*), of Antwerp, is the most famous of these refugees. The appearance of the *Italic* type, the sloping letter supposed to have been modelled on the handwriting of the poet Petrarch and first used by Aldus of Venice in his Virgil, 1501, deserves to be noted. The 16th century also showed a superb development of the art of the wood-cutter, who was the normal illustrator of the printed book.

The 17th and early 18th centuries may be considered the period of decadence in printing. To the Englishman, John Baskerville, must be attributed the pernicious example of exaggerating

the "thicks" and "thins" of the letters, an example widely imitated on the Continent, as by Bodoni and Didot, with results deplored by all artists. Baskerville's contemporary, William Caslon, the typefounder, did much to retrieve this error of judgement, and his beautiful fount survives in honour to the present day.

While England can claim no considerable share in the early development of printing, she has made amends in the modern revival through the work of the Kelmscott Press and the other famous private presses, the Vale, the Doves, and the Ashendene. Of the commercial presses, the fine work done by the Chiswick Press, largely under Morris's inspiration, and more recently of the Arden Press, has to be noted.

Early Newspaper Printing

With regard to the history of newspapers, two dates are of technical interest: 1622, the date of the issue of the first weekly paper, *The Weekly News*; and 1702, when *The Daily Courant* appeared. Both were produced by a process which essentially differed in nothing from the press used by Caxton. Forty small sheets an hour, printed on one side, would be about the output of each press in those days. A modern newspaper press will produce 60,000 copies an hour duly printed, folded, and counted into quires or bundles of 26.

PRINTING PROCESSES. Printing may be defined as a process for multiplying copies of an original by inking a prepared surface and transferring the impression to paper or other material. There are three processes, determined by the nature of the printing surface:

(1) Relief or surface printing, for which a general term is found in letterpress printing. In this, as the various terms imply, the printing surface is raised. The most familiar example is the ordinary rubber stamp, which, being inked from a pad, is then impressed upon the paper. By far the greater volume of printing is produced by this process. It is indeed the normal method of book and newspaper production.

(2) The intaglio process. Here the ink is forced into excised lines or hollows cut or etched in the plate, which is then carefully wiped. The paper is then pressed down into the plate and so takes up the ink. A much greater amount of a stiffer ink can be absorbed in this way. A common example is the copper-plate visiting card, on which the finger can detect a perceptible raised lettering as contrasted, say, with the letterpress effect of a page

of this Encyclopedia. The finest indentations or scratches on a copper plate are capable of taking and transferring the ink; hence the wide range of tones in this beautiful process, by which are produced all the finer etchings, steel engravings, mezzotints, and photogravures; while a mechanical development of it produces the many rotary-machine printed photogravures now obtainable.

(3) Flat surface, planographic, or lithographic printing. The lithographic method depends upon an entirely different principle, the absorption of water and the rejection of oil, or the mutual repulsion of grease and water by certain porous material; stone, in particular a fine stone from Central European quarries, synthetic stone made from cement, zinc, and now quite commonly aluminium, are used. The design is made upon the printing surface in a greasy ink; the surface is next carefully washed; the stone is then inked; the watered, or blank parts, repelling the ink and only the design, or greasy parts, taking the ink. The copy is then printed and the watering and inking processes repeated.

(4) There are, besides, variations of these main processes, e.g. the offset process, whereby the impression from lettering or illustrations is transferred to a cylinder of rubber, or other resilient material, which again transfers the impression to paper; and (5) the electric contact process, not yet commercially practicable, whereby the impression is obtained on a chemically prepared paper by passing the current through the metal of the type, without the use of ink.

LETTERPRESS PRINTING. The main material consists of movable types and blocks or plates, or stereotype and electrotype moulded from them, the printing surface being in relief or raised.

Hand and Machine Setting

The arrangement of type and the general preparation of the printing surface before it goes to the machine is included under the heading of composition. Composition is of two kinds, hand setting and machine setting. In the case of hand-set work, the compositor stands at a high desk, on which are arranged, one above the other, two cases divided into compartments containing metal letters. The upper case contains the capital letters; the lower, nearer to the operator's hand, contains the more frequently used small letters. The position of the letters in the cases is dictated by the frequency with which they are required. The cases contain, besides letters with a printing

surface, metal blanks, called "spaces" and "quads," to place between the words and at the ends of short lines. The compositor, holding in his hand a metal case, called a composing stick, or setting stick, gauged to the width of the panel of type decided on for the page, picks the letters one by one from his cases, and sets them upside down from left to right, his first line of type being at the bottom of the stick. If he needs extra space between the lines of type, he inserts "leads." The type is transferred from the setting stick to trays of metal, called galleys. From these galleys rough proofs are taken on long strips of paper called galley proofs, which are sent to the reader and author for correction. (See Proof Correction.)

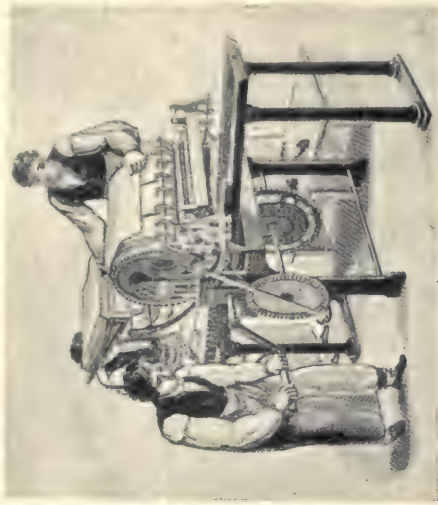
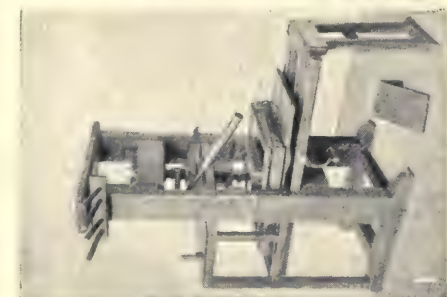
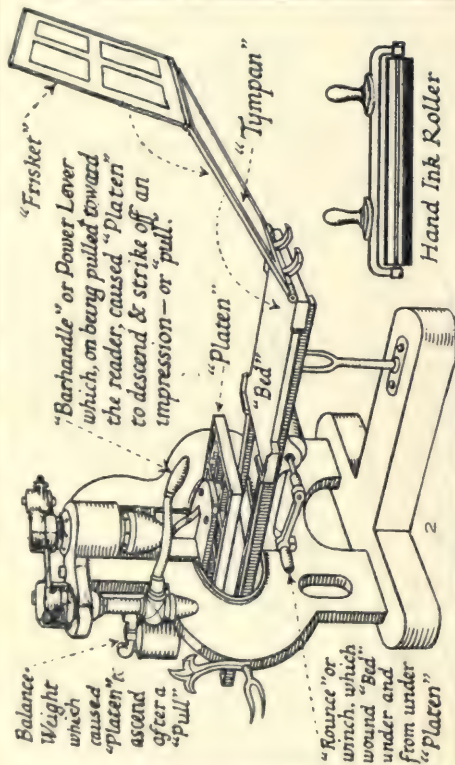
Make-up of Pages

When the matter in galley form has been corrected, the compositor makes up the pages. He arranges or "imposes" them, together with any engraved plates or blocks of pictures, or plans which are to be used, in an iron frame or "forme," in such a way that they fold in proper sequence, with accurate allotment of marginal spaces. These spaces are allowed for in the forme by the insertion of metal or wooden blocks, called "furniture," and the artistic effect of printed matter depends very notably on the arrangement of the margins. A rough working summary of the best practice is that in the case of a book the double page opening should be treated as the unit of design; that the head margin should be less than either the side, middle, or "gutter," and tail, or foot, margins; that the gutter should be equal to each of the side margins, and the foot or tail margin substantially deeper than the side margin.

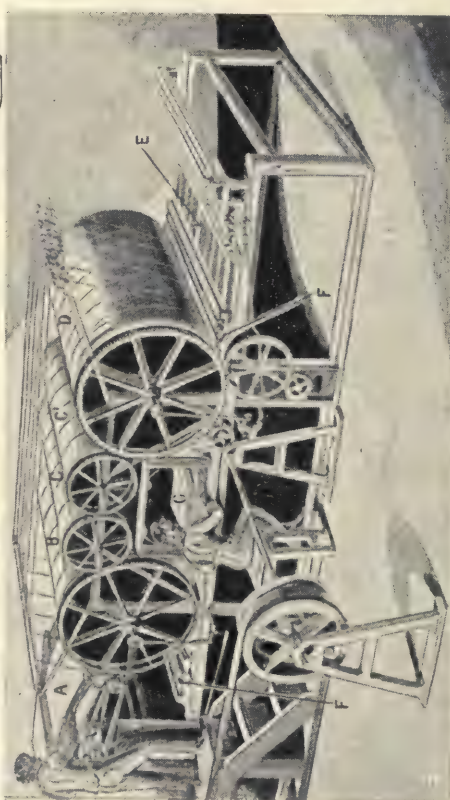
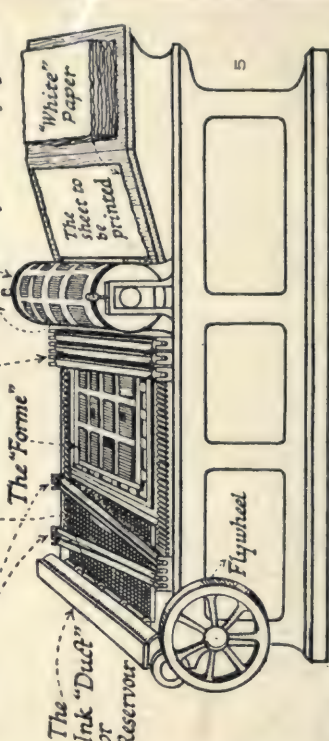
If two or more colours are to be used in the printed page, this accurate adjustment or "register" is a matter of peculiar delicacy. The forme when arranged is "locked" with the "furniture," "sidesticks," and little wedges called "quoins," or equivalent devices. The process of putting back used type into the cases is called distribution.

With regard to machine composition, the types of machine in most common use are the linotype, the intertype, and the monotype; the first two generally used for newspapers, the latter mainly for book and magazine printing. (See Linotype; Intertype; Monotype.)

MACHINING. The process of printing from the forme or a stereotype or electrotype of the forme is called

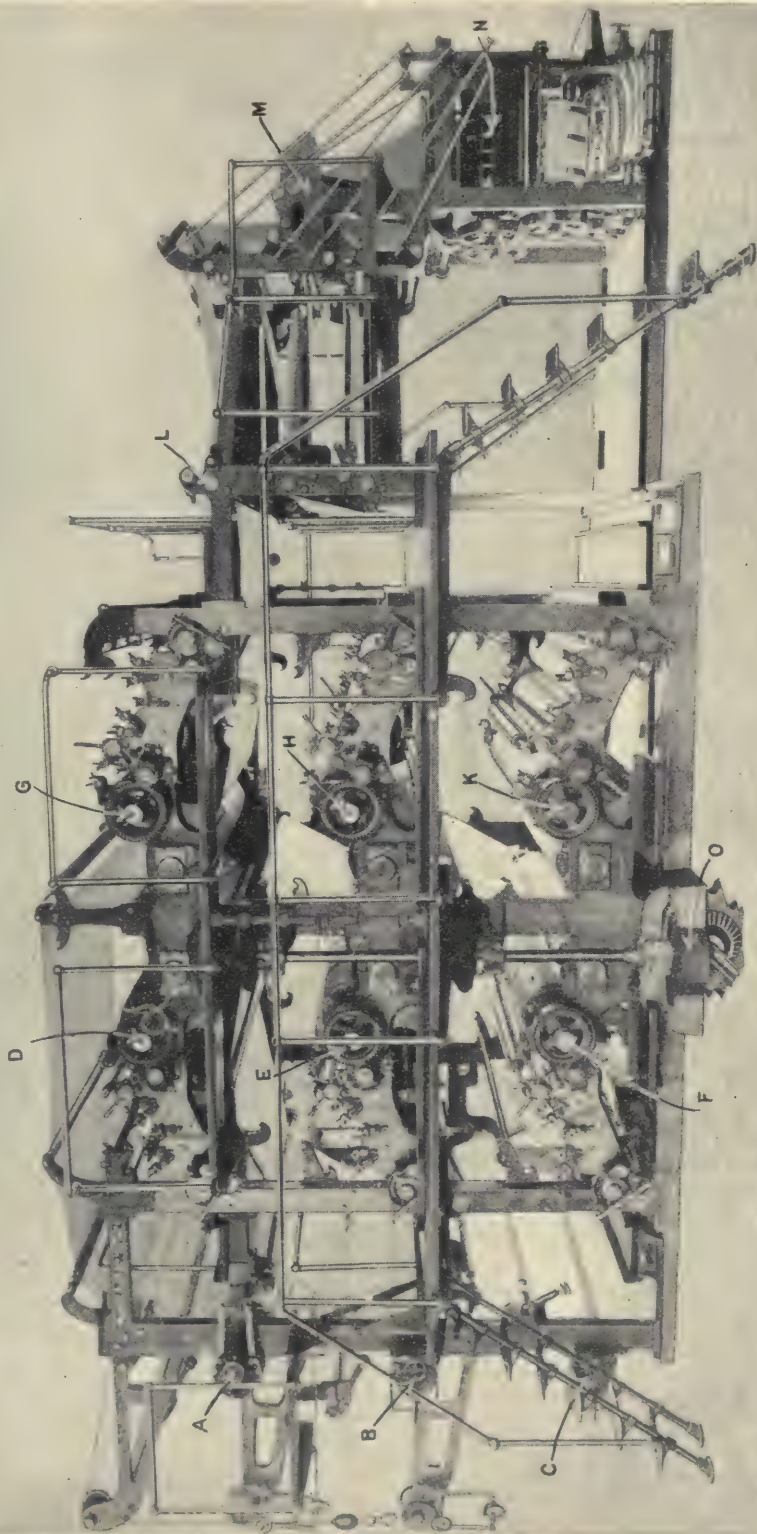


The Inking Rollers
The "Inkable"
The "Forme"
The Impression Cylinder carrying the "Packing" and "Makeready."



on both sides: A, Paper being laid on; B, cylinder which made first impression from the flat type; C, intermediate cylinders; D, final impression cylinder; E, forms of type which passed under inking rollers, F, at each end of machine, before coming beneath paper cylinders; G, printed sheets being delivered. 5, Main features of single cylinder flat-bed press. Forme is carried under inking rollers to position below laying-on board, cylinder rising automatically to clear it, and sinking to make impression as forme returns

1. Wooden hand press of the type used by Franklin in 1725, and differing little, probably, from that of Caxton, 1477-91 (Victoria and Albert Museum). 2. Hand press invented by the 3rd Earl Stanhope, 1800, in which an iron framework was substituted for the wooden body of its predecessors. 3. Hand power machine by Napier, c. 1820, printing from the flat, with the rotary principle adapted to the paper-feed (from a woodcut). 4. Bensley's machine, 1822, driven by steam power and producing 800 to 1,000 sheets per hour, printed



Latest type of sextuple newspaper press, capable of printing 64,000 twelve-page papers, 264 ins. by 19½ ins., per hour, folded to half-page size and counted in quires. It will produce papers up to 24 pages at the rate of 32,000 copies per hour, also folded and counted in quires. A, B, C. Reels of paper four pages in width. D, E, F. Plate-carrying cylinders printing on one side of the paper. G, H, K. Similar cylinders printing on the other side of the paper.

PRINTING: FROM THE OLD HAND PRESS TO THE ELECTRICALLY DRIVEN ROTARY MACHINE OF A MODERN DAILY NEWSPAPER

Photograph on this page by courtesy of R. Hoe & Co., Ltd. Drawings 2 and 5 by courtesy of John Hogg

After passing G, H, K, the paper from each reel is cut into two-page width, and the six strips are gathered together at L. M. The former, which gives the first fold to the sheet. N. Folding and cutting cylinders, which cut the paper and give to it the final fold before it is delivered to the folding band. The motive power is supplied at O by an electric motor, which is situated in a pit under the floor. A sextuple press carries eight plates on each cylinder

machining: A glance at the diagrams of the early wooden hand-press, and the iron Stanhope press, invented by Earl Stanhope in 1800, will show how little change in the mechanical equipment of the printer took place between the 15th and the 19th centuries. Its chief features are a flat bed on which the frame or "forme" containing the type is placed face upwards, and a folding leaf, holding the paper to be printed, which lowers it on to type that is inked either with the old inking ball or the more modern hand ink-roller. Pressure is then applied by lever and screw to a plate or platen of metal, which forces the paper on to the type, and so transfers the impression.

In the modern platen machine, whether such is worked by treadle or by mechanical power, the paper is placed on the platen and carried to and from the type forme, which is in a vertical position. In these types of machine both paper and printing surface are flat. The first radical mechanical innovation affecting speed and cheapness, and therefore the wider distribution of printing, was that of König, in 1811. In König's machine the paper is applied to the forme by means of a revolving cylinder, which holds the paper in its passage across the type. This is the normal type of machine employed for the production of book printing to-day. Modern machines on this principle are fitted with an auxiliary attachment which feeds sheets into the machine automatically, and will produce 1,000 sheets per hour, $65'' \times 45''$, in two colours simultaneously; many of the coloured plates in this Encyclopedia were so produced. The introduction of the impression cylinder developed the factor of speed. The modern newspaper press proceeds with that development by the addition of a type or, rather, plate-carrying cylinder.

Use of "Make-Ready"

When the forme comes from the composing room to the machine room, all matter in it, whether type or blocks, is theoretically of equal height ("type high"), but in practice, so delicate is the printing process that very minute adjustments ("make-ready") are necessary before the formes can be printed off on the machine.

Make-ready embraces overlay and underlay. In underlaying, the machine minder pastes under the forme thin strips of paper to adjust accurately the general level of the forme. Overlay, a more complex process, concerns itself with the still remaining inequalities of the

printing surface. A rough copy is taken of the matter, which reveals sundry patches, some too light, some too dark, indicating insufficiency or excess of pressure. The parts of the sheet where excess of pressure is shown are cut away, and those where there is insufficient pressure are built up by minute additions of tissue. The patched sheet is then accurately adjusted to the tympan in hand-presses, to the platen in platen machines, to the impression cylinder in flat bed cylinder machines, so that it touches the forme precisely where it did when first printed, and therefore so that the inequalities of pressure are removed. Colour printing on a letterpress machine is obviously only a complication which involves no new principle.

It may be interesting, in conclusion, to recall in rapid survey the various processes as they are exemplified in the production of a modern newspaper.

Newspaper Production

The "copy," passed by the sub-editors to the composing room, is distributed among the linotype operators (very often a single short article or paragraph will be broken up among three or four operators), whose work is then assembled and put together by the "stone hands." The "stone" is a large, flat, metal-topped table, originally in early printing practice a large, flat stone, on which the formes are made up, a forme for each page. This will normally consist of news matter, with probably some illustrations, that is, a combination of types and engraved plates. Of this flat forme a mould is taken by laying a thin sheet of a tough, clayey cardboard ("dry flong") over the type, and passing it through the mangle, which under enormous pressure takes an impression of the matter in the forme. This is then dried and fitted into a curved casting box of the auto-plate machine, which produces a replica of the forme in the shape of a metal plate, semi-cylindrical in form. This, with similar plates of the other pages, is attached to the type cylinder, and the huge machines are ready to be set in motion.

In practice, a modern newspaper press is a composite machine with many replicas of the type matter with cutting and folding apparatus, producing completed copies at several delivery points at from 60,000 copies per hour. The ink is pressed into the ink ducts through tubes connected with an ink reservoir overhead. The paper spool unwinds itself into the machine, the paper passing between

the type and impression cylinders (each pair printing one side of the paper), and so through into the cutting and folding gear. The whole machine is electrically operated, being put in and out of action by a system of control push-buttons. The average newspaper machine prints copies in black only, but there are many running of a very modern type which turn out newspapers printed in four colours.

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Printing House Square. London square. It is at the E. end of Printing House Lane, Water Lane, Blackfriars, E.C. Since 1788 occupied by the printing office of The Times (*q.v.*), its name is due



Printing House Square, London. Part of the printing office of The Times newspaper

to the existence here from the time of Charles II, to Feb., 1770, of the King's printers. William Faithorne, the engraver, died here in 1691. The site is said to have been once occupied by the Norman tower or castle of Mountfiquit, or Mountfichet. Part of the Roman wall was discovered here in 1849.

Prinz Adalbert. German cruiser. She was sunk by British submarine E8 off Libau, Oct. 23, 1915, and nearly all aboard the cruiser, numbering at least 550, were lost. The Prinz Adalbert was an armoured cruiser 410 ft. long, 65 ft. in beam, and displacing 9,000 tons. Her engines were of 17,500 h.p., giving a speed of 21 knots. Her guns were four 8-inch, ten 6-inch, and 24 smaller; and she had four torpedo tubes, three of them being submerged.

A German liner of this name belonging to the Hamburg-Amerika line was in Falmouth when the Great War broke out, and was detained by the British. Condemned by the prize court as enemy property in 1916, the decree of confiscation was cancelled in 1918.

Prinz Eitel Friedrich. German armed liner. While commerce raiding in the Atlantic, she sank, among other vessels, the American sailing ship William P. Frye carrying a cargo of wheat from Seattle to Falmouth. The Germans maintained it was contraband. News of this outrage upon a neutral became known in the U.S.A., March 11, 1915, when she put into Newport News for coal and re-

pairs, and there landed some of the crew of the American ship. She was interned on April 8.

Prior. Ecclesiastical title for the member of a monastic establishment second in rank to the abbot, or, where there is no abbot, the head of the establishment. The original term was *praepositus*, provost. The prior is generally entrusted with the discipline of the monks, management of property, etc. The position of the prioress is a corresponding one in women's orders. The house over which a prior or prioress presided was known as a priory. See Abbey; Monastery.

Prior, MATTHEW (1664-1721). English poet and diplomatist. Born probably at Wimborne Minster, Dorset, on July 21, 1664, the son of a joiner, he was brought to London and sent to Westminster School, where he had reached the third form when his father died. He then had to assist his uncle, a vintner, at the Rhenish wine-house in Cannon Row, but by the liberality of Lord Dorset was enabled to return to Westminster, whence he went to St. John's College, Cambridge, of which he became a fellow in 1688. This fellowship he retained until his death.

Friend of Bolingbroke, Gay, Swift, and Arbuthnot, Prior spent the greater part of his life in the diplomatic service, at The Hague and in Paris. The treaty of Utrecht, 1713, was familiarly known as Matt's Peace. He was on good terms with William III and Louis XIV, was M.P. for East Grinstead, Feb.-June, 1701, succeeded John Locke as commissioner of trade, 1700-7, and was commissioner of customs, 1711-14. At first an adherent of the Whigs, he joined the Tories in 1702. In 1715-17 he was imprisoned in the Tower on a charge of treasonable intrigue in connexion with the treaty of Utrecht.

In 1719, by the assistance of friends, he brought out a sumptuous folio edition of his poems, which brought him 4,000 guineas. To this Lord Harley added an equal sum for the purchase of Down Hall, near to Hatfield Broad Oak, Essex, where Prior henceforth chiefly resided. He died while on a visit to Lord Harley at Wimpole, Cambridge, Sept. 18, 1721, and was buried in Westminster Abbey.



Matthew Prior

As writer of *vers de société*, none, perhaps, has excelled Matthew Prior in humour, grace, ease, and spontaneity. Master of many metres, he liberated English verse from the thralldom of the heroic couplet. Of his two longer works, *Alma*, or the Progress of Mind, modelled on Hudibras, is the more notable. But he is at his best in his epigrams, as that on Bibb and Charon; his verses to children: *To a Child of Quality*, and to the Honourable Lady Margaret Cavendish Holes-Harley (Peggy); and in such verses as *The English Padlock*, *The Garland*, and *The Female Phaeton* (Kitty). His Tales are largely lost to the modern reader on account of the change of literary taste.

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Prior, MELTON (1845-1910). British war artist and correspondent. Born in London, Sept. 12, 1845, the son of William Henry Prior, landscape painter, he joined the staff of The Illustrated London News in 1868, and, beginning with the Ashanti War, 1873, represented that paper in over 24 campaigns and revolutions, including the siege of Ladysmith, 1899-1900, and the Russo-Japanese War, 1904-5. He died Nov. 2, 1910. See Campaigns of a War Correspondent, ed. S. L. Bensusan, 1912.



Melton Prior, British war artist
Elliot & Fry

Priority. In English law, term used in connexion with the law relating to mortgages and other charges on property. The owner of property may mortgage or charge it as often as he pleases, so long as he can get people to lend him money on it; and, if he has done so, it frequently becomes of great importance to know whether one mortgage or charge has priority over another, because when the property is eventually realized there may not be enough to satisfy everybody. As a rule, such successive encumbrances rank for priority in order of date.

Pripet. River of W. Russia. Rising in the swamps of W. Volhynia, it traverses the govts. of Minsk and Kiev, and after flowing through vast tracts of almost uninhabited country, the Pinsk or Pripet marshes, falls into the Dnieper, 50 m. N. of Kiev. It is navigable to Pinsk, and is connected by canals with the Niemen and Vistula. Its length is about 500 m. During the Great War the district was prominent in the fighting between the Germans and Russians, engagements taking place at various points, Sept., 1915, a Russian force being driven back to the marshes where further pursuit was impossible. See Lutsik, Battles of.

Priscillian (d. 385). Spanish heretic. A man of birth, fortune, eloquence, and learning, his teaching appears to have been an admixture of Gnostic and Manichaean doctrines. He exerted influence at the court of the emperor Gratian, and by two bishops, whom he converted to his views, was made bishop of Avila. The civil power being invoked, Priscillian and several of his followers were, by order of Maximus, put to death at Treves, the first victims of a criminal prosecution for heresy. S. Martin of Tours, and S. Ambrose, while disavowing sympathy with Priscillianism, entered a protest against capital punishment for heresy. The sect founded by Priscillian existed until about 560. The term Priscillianists is sometimes applied to the Montanists from an early prophetic of Montanism (*q.v.*) called Priscilla. See Priscillien et le Priscillianisme, E. C. Babut, 1909.

Priscus, HELVIDIUS. Roman statesman who lived in the 1st century A.D. Son-in-law of Thrasea Pactus (*q.v.*), whom he resembled in his disgust for the imperial régime and regret for the old republic, his attitude made him obnoxious to Nero, and he suffered banishment when his father-in-law was put to

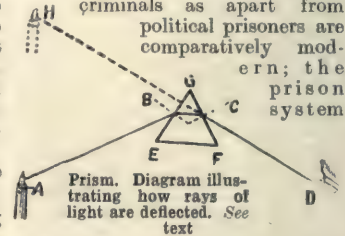
death in 66. He subsequently returned to Rome, but his too openly expressed sentiments incurred the disapproval of the emperor Vespasian, and he was again banished and soon afterwards put to death.

Prishtina OR PRISTINA. Town of Yugo-Slavia, in Serbia. Situated on the E. side of the Kosovo Plain, it is 60 m. N. of Usküb close to the rly. from Usküb to Mitrovitsa. In normal times it has a fair trade in grain and wine. It was captured by the Serbs from the Turks on Oct. 22, 1912. During the Great War it was occupied by the Austro-Germans, Nov. 26, 1915, and reoccupied by the Allies in Oct., 1918. Pop. 10,000.

Prism (Gr. *prisma*, something sawn). Semi-regular solid. The two faces or bases are equal polygons, and the lateral faces parallelograms. A right prism has the lateral faces perpendicular to the bases. If the bases are regular polygons, and the prism is also a right prism, it is called a regular prism. The prism used in optics is usually a triangular prism, *i.e.* its bases are triangles. In the figure A is a source of light and A B a ray which is deflected along B C to

the eye, D, of the observer, by the prism G E F. The light appears to the observer to be in the line D C H. See Binocular; Crystallography; Dispersion; Optics; Spectrum.

Prison. Place where persons are confined or restrained in their liberty. Prisons as places of detention are prehistoric, though prisons exclusively for the reception of criminals as apart from political prisoners are comparatively modern; the prison system



of punishment is chiefly a product of the 19th century. Prisons were, in fact, originally places of detention and not of punishment. See Bastille; Dartmoor; Millbank; Newgate; Pentonville; Tower, etc.; also Borstal System; Criminology; Penology; Reformatory.

Prison Breaking. In English law, the breaking out from any place by a prisoner who is being lawfully detained upon a charge



of, or under sentence for, a felony or misdemeanour. The place need not be a prison, but there must be an actual breaking in the legal sense, as distinct from escaping. In Scotland the offence is confined to escaping from prisons and does not apply to other places of detention. The escape may be in any manner, and is not confined to actual breaking out.

Prison Commission. Department of the home office which looks after the convict prisons in England and Wales. It consists of



Prison. Circular, centrally controlled prison in Illinois, U.S.A., based on penological principles. Top, right, interior, showing guard's controlling tower from which a view of every cell is obtained

a chairman and four paid commissioners, assisted by inspectors and other officials. In Scotland similar duties are performed by the Prison Commission, 11, Rutland Square, Edinburgh, and in Ireland by the General Prison Board at Dublin.

Prisoner of War. Subject of a belligerent country detained for a period of war. In early times prisoners of war were regarded as the property of their captors, and as such were liable to slavery, or to ransom, if their rank and wealth permitted it; and it was not until the 13th century that the exchange of prisoners began.

During the 19th century the growth of humanitarian sentiment gradually brought recognition that a prisoner had certain rights, and the Hague Convention of 1907, of which Germany was a signatory, included detailed regulations designed to ameliorate the condition of life in internment camps.

During the Great War the enormous numbers of prisoners on both sides made full compliance with these and other conditions a matter of considerable difficulty. While Great Britain treated enemy prisoners on the whole with something like generosity, large numbers of British prisoners in German hands suffered almost incredible hardships and indignities. Some camps were much worse than others, those in Prussia being, perhaps, the worst. The Turks had a bad reputation for brutality.

The transmission to prisoners of war of letters, parcels of food, clothing, etc., involved during the Great War the building-up of an enormous organization. The various official information bureaux attempted to keep an exact record of every prisoner of war. The many philanthropic and regimental funds for supplying British prisoners with comforts were finally coordinated with good results, and many men were literally kept alive by means of the parcels which reached them.

The exchange of prisoners between belligerents may take place at any time on a basis of equality by formal agreement, but during the Great War a long time elapsed before any such agreement was reached. Switzerland, however, received a certain number of badly wounded officers and men, and cared for them until repatriated.

A prisoner of war is bound to state his true name and rank, but cannot be compelled to give any further information to the enemy. If he attempts to escape, he may be shot down, but is not to be treated as a criminal. Officers must be given the pay of their rank, and they pay for their maintenance.

They must not be set to work. On the other hand, a British prisoner of war is liable to punishment on returning home if it is proved that he was taken prisoner through want of due precaution, disobedience to orders, or wilful neglect of duty; or if he fails to rejoin if able to do so, or serves or voluntarily aids the enemy. See Döberitz; Internment Camp; Ruhleben.

Prisoner of Zenda. THE. Romantic drama founded by Edward Rose on Anthony Hope's novel of the same name. It was produced Jan. 7, 1896, at the St. James's Theatre, London, where it attained a run of 254 performances. The story is concerned with the attempt to substitute Rudolf Rassendyl, a young Englishman, for the king of Ruritania. George Alexander played Rassendyl and King Rudolf V, Evelyn Millard Princess Flavia, Herbert Waring Duke Michael, H. B. Irving Captain Hentzau, and W. H. Vernon Colonel Sapt.

Prisoner's Friend. At courts martial, a person, officially styled Friend of Accused, authorised to assist the accused in his defence. He may be a qualified legal adviser or any other person. If the friend is not a barrister, a solicitor, or an officer subject to military law, he can only advise the accused and suggest questions to be put by him to witnesses; but if he is a barrister, a solicitor, or an officer subject to military law, he has the rights and duties of counsel under the rules of military law.

Prison Reform. Term used to express the efforts, legislative and otherwise, to improve the position of criminals undergoing detention.

The first to call serious attention to the terrible state of the prisons in England and Wales was John Howard (1726-90). His *State of the Prisons in England* was an investigation of the penal system without parallel, but though his tale of horror stirred public opinion, it was not till fifty years after his death that the first real steps in reform were taken. The dark cell was still a favourite form of prison punishment in the early decades of the 19th century; Millbank was a place without humanity, Newgate a pestilential horror. The work of Mrs. Fry, who first visited Newgate in 1813, and that of the Prison Discipline Society produced temporary reforms only. In 1839 a new era was inaugurated by a bill for advancing separate confinement of prisoners, and in 1842 Pentonville was finished, the first model prison where isolation was carried out in an extreme form. Till 1853 prisoners wore masks

along the passages, sat in separated pigeon-holes in chapel, and were partitioned off whilst undergoing the dreaded treadmill punishment.

The aim of all modern prison reform is reform of the prisoner by methods of humanity, as opposed to methods of torture of either body or mind. Prisons are on the cellular principle, though the application of that principle has varied enormously. In France, Holland, Belgium, Portugal, Norway and Sweden, and Germany it is practised with extreme severity. In Belgium and Holland in particular the cellular system has been carried to the utmost lengths of human endurance. In the British Dominions the cellular system has been widely adopted, though modified to suit local conditions, generally on the humane side. In New Zealand, for example, convicts are taught farming, each being supplied with his own plot of land and a healthy rivalry encouraged, and every released prisoner is found employment and removed as far as possible from any chances of slipping back.

The American prison systems vary, from the most advanced to the most backward. The reformatories at Elmira and Concord are examples of the best modern practice, and the county gaols of the worst prison systems. See Borstal System; Conciergerie; Criminology; Millbank; Newgate; Penology; Punishment.

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Pritchard, Edward William (1825-65). British poisoner. He was born at Southsea, Hampshire, and, after qualifying as a surgeon, served for a short time as a naval surgeon before marrying the daughter of a retired silk merchant and settling down to practice in Yorkshire, and in 1860 in Glasgow. In Dec., 1864, his wife was taken ill. In 1865 her mother, Mrs. Taylor, came from Edinburgh to nurse her, and died mysteriously on Feb. 25. Mrs. Pritchard dying on March 17. Although the suspicions of other medical men who had seen the patients were aroused, Pritchard completed all the formalities in connexion with their burial, and was present at the funerals. An

anonymous letter to the authorities turned their attention to the case, and the poisoner was arrested on his return from his wife's funeral. At his house quantities of tartar emetic were found, and the exhumed bodies on analysis showed traces of antimonial poisoning. Pritchard confessed to his crimes, the motives being the small fortune which would come to him as a result, and an intrigue with his servant. He was hanged outside Glasgow prison, July 28, 1865, this being the last public execution in Glasgow. See Trial of Dr. Pritchard, William Roughead, 1906.

Prittlewell. Dist. of Southend-on-Sea, Essex. It lies to the N. of the borough proper, and has a station on the G.E. Rly. It has a fine church, S. Mary the Virgin, mainly Perpendicular in style, but retaining a little Norman work. There was a priory here until the Reformation. See Southend.

Privas. Town of France. The capital of the dept. of Ardèche, it stands on the N.E. slope of Mont Toulon between three valleys, 95 m. S.W. of Lyons. There are iron mines, distilleries, and silk factories, and a trade is carried on in truffles, butter, cheese, and game. The town grew up round a castle, built in the 12th century, and was the ancient capital of Boutières. It became a stronghold of the Huguenots, and in 1629 Louis XIII decided to reduce it. After a stubborn defence the place surrendered to him, the castle and other buildings being razed.

Private Bill. In British parliamentary procedure, a bill promoted by private individuals to enable them jointly to construct and work a railway or other scheme of public utility at their own risk. Other private bills are concerned with naturalization, divorce, etc. The fees paid by the promoters of all private bills are fixed by the standing orders. See Bill; Parliament; Standing Order.

Privateer. Armed vessel privately owned and furnished with letters of marque. These empowered it to attack the ships of any power with which its country was at war. Privateers are things of the past. See International Law; Letter of Marque.

Private Secretary. THE FARCI- cal comedy in four acts. Adapted by Charles Hawtrey from Von Moser's *Der Bibliothekar*, it was produced at the Prince's—now Prince of Wales's—Theatre, London, March 29, 1884, with Beer-bohm Tree as the Rev. Robert Spalding and W. J. Hill as the irascible Cattermole. It was afterwards transferred to the (old)

Globe, where W. S. Penley took up the part of Spalding, and ran for 785 continuous performances.

Privet (*Ligustrum vulgare*). Shrub of the natural order Oleaceae, native of Europe and N. Africa. It has opposite, oblong-lance-shaped leaves and small, funnel-shaped white flowers in abundant clusters. The fruit is a small, round, purple-black berry, which yields oil and a rose-coloured dye.



Privet. Leaves and berries of the European shrub

Privilege (Lat. *privilegium*). Word used in two related senses: (1) exemption of an individual or class from ordinary law; (2) peculiar right or advantage enjoyed by a person or body of persons in the community.

In English parliamentary privilege is of three kinds: (a) privilege enjoyed by individual members of either house, e.g. freedom of speech in parliament, freedom from legal arrest and imprisonment except for indictable offences, contempt of court, etc., exemption from jury service, and from obeying subpoenas: a member who is declared bankrupt vacates his seat thereby; (b) privilege enjoyed by either House as a whole, including the power of ordering the publication of any document, however libellous, of committing individuals to prison, of instituting prosecutions

through the attorney-general, and, in the case of the House of Lords, the right of members to be tried by their peers; (c) privilege belonging to both Houses jointly, e.g. the right to assume supreme power when the throne is vacant, or the sovereign incapacitated from carrying out his constitutional functions. Many of these privileges are of a vague nature, and, being based on precedent or tradition, are rarely exercised; but questions of privilege raised in parliament take precedence of all other business, for hard-won privileges are jealously guarded against all encroachment.

Clergymen are privileged from arrest while going to service, holding service, and returning from service, and barristers while going to, performing, and coming back from their professional duties in court. By charter corporations of various kinds enjoy definite privileges, many of which are of long standing. Statements made to a priest in confession are also privileged. See Libel; Parliament.

Privy. Term used in English and American law to denote a direct legal relation. Privy in blood indicates a blood relationship, e.g. heir and ancestor. Privy of estate indicates that the persons of whom it is predicated have a relationship with regard to the title to property. For example, there is privy of estate between a lessor and lessee and their assignees, between joint tenants; and the privy lasts so long as the estate lasts, so that an assignee of a lease ceases to have privy with the lessor if he assigns the lease again. Between a lessor and a sub-lessee there is no privy. Privy of contract is the term used to describe the relation between parties who have entered into contractual relations with each other, or between the assignees of the contracting parties who, by law, are put in the place of the persons who originally contracted.

THE PRIVY COUNCIL

A. F. Pollard, M.A., Professor of English History, London Univ.:

Other articles on constitutional questions include Commons, House of; Lords, House of; Parliament. See also England: History; Cabinet; King; Prerogative, and the articles on the departments of state, e.g. Trade, Board of, that are offshoots of the Privy Council

In the Middle Ages in England there was but one king's council, though that council might at times be great and at others small, and there was a prolonged struggle between the barons and the crown over the form the council was eventually to take.

The baronial ambition was to make the king's council a *magnum concilium* consisting mainly of

barons, and ensuring a baronial government. The crown naturally sought to keep it a royal council, small in numbers, continuous in its sessions, appointed by the crown, and subject to its will. The form of the council, therefore, fluctuated with the strength or weakness of the crown. Under Henry III it was a *magnum concilium*; under Edward I purely royal. Under

Edward II the barons again came to the front, and the king sought to counter their offensive by developing a council which was called *concilium continuum, secretum, or privatum*. Now the council might be held in Parliament or out of Parliament, and there was little difference between the great council in Parliament and the body which, in Henry VIII's reign, came to be called the House of Lords. Hence the great council in Parliament merged in the House of Lords, while the great council out of Parliament was summoned less and less often, until it flickered out of existence on the eve of the Great Rebellion.

The Council Organized

The small royal council continued, however, to develop, and by Richard II's reign it was known as the privy council. It governed during the minority of Henry VI, but suffered from the subsequent decline in royal authority, and the Wars of the Roses broke out because the privy council floundered between the factions of York and Lancaster. Its history for some time after 1485 is exceedingly obscure; Henry VII at first governed personally with such advice as he chose to take from councillors who were not apparently organized in a body, but before the end of his reign there was a president of the council, and it was completely reorganized under Henry VIII, to whom so much of the British constitution owes its modern form.

From 1540 it possessed a regular staff of clerks and other officials; and its records became both regular and abundant, and from it most of the existing administrative system has developed. It had two main functions during the 16th and 17th centuries. Firstly, it sat "at the council board" to act as a council of state, discussing and advising the crown on all matters of policy and taking administrative action; and secondly, reinforced by judicial and other assessors, it sat on Wednesdays and Fridays in a room known as the star chamber (*q.v.*), which was better adapted than "the council board" for the functions of a court of law. Besides these functions it controlled similar subordinate bodies, which might almost be called committees of the privy council, namely, the councils of the N., of Wales and its Marches, and the Irish privy council. Later on there developed other committees of the privy council.

The privy council consisted of a selection of the "ordinary" councillors of the crown who only

survive to-day in the K.C.'s; but in its turn, owing to the growing complexity of government and other causes, the privy council tended to increase in size. Under Henry VIII twenty was about the average number. Northumberland added to its numbers for partisan reasons, and Mary carried the process further until there were over fifty. In her reign an inner ring already began to appear, but Elizabeth restored the efficiency of the privy council by reducing its numbers to twenty or even fewer, and they remained at this figure until the Restoration. Then they increased again, and "inner rings" began to appear, like the Cabal.

This tendency resulted in the modern cabinet, and the privy council was gradually reduced to formal business. It retained, however, one function of importance in the 18th century, and continued to debate and to determine the fate of Irish bills, which, by Poynings' Law, had to receive its sanction before they could be introduced into the Irish parliament. This function disappeared with the establishment of Grattan's parliament in 1782, but the executive activity of various committees of the privy council continued long after the functions of the main body had been absorbed by the cabinet, and departments like the boards of education, trade, and agriculture are still technically committees of the privy council.

The Judicial Committee

Of these committees the most important is the judicial committee of the privy council. The Long Parliament abolished the court of star chamber in 1641, but the civil jurisdiction which the privy council had exercised "at the council board" survived and expanded until the judicial committee has become the most important law court in the empire. It is the supreme court of appeal for all civil cases arising in the empire outside the British Isles, and within them it is the supreme court for ecclesiastical appeals, although ecclesiastical prejudice hampers recourse to it. The judicial committee may thus have to adjudicate upon religious disputes of hill tribes in India, involving local customs, Mahomedan or Hindu law; on cases from South Africa or British Guiana involving points of Roman-Dutch law or native customs; on constitutional disputes between provinces in the Dominion of Canada or states in the Commonwealth of Australia; and on powers claimed by the Dominions themselves. In form it is not a court at all, and its members sit without

any judicial trappings, state, or dignity, except that which the importance of their business gives them. Technically, they are engaged in giving advice to the crown, and that advice, when tendered, has more effect than the decisions of any law court in the world. No other body does so much to give the empire its legal and constitutional unity.

Apart from these committees the privy council has ceased to discharge any but formal functions, and membership has become an honorary distinction, conveying the style "right honourable," and frequently conferred upon men without any qualification to perform the duties once assigned to the privy council.

Privy Councils in the Empire

In addition to this privy council, which, from being one for England alone, has come to be one for the whole empire, with ministers of the crown in Canada, Australia, S. Africa, and elsewhere among its members, there is a privy council for Ireland. To it ministers and others connected with the government of that country belong, while its membership is conferred also as an honour on those who have done the state service. In Canada a privy council has been formed for the Dominion on the English model. Scotland had a privy council until the union of 1707, when it was merged in the English one. Privy councils or their equivalent, councils of state, exist in some foreign countries, and before the Revolution France had one very like that of England.

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Privy Purse. Money granted to the king and queen from the civil list for their own personal expenditure. Under the king's direction the expenditure of this money is managed by the privy purse office, at the head of which is the keeper. In 1910 the amount was fixed at £110,000 a year. See Civil List.

Privy Seal. In the United Kingdom, a seal used by the sovereign. It is second in importance to the great seal, but is now rarely used. This seal was used on warrants requesting the lord chancellor to affix the great seal, and for documents which were not of sufficient importance to require the great seal. The necessity for the former was abolished in 1884. The keeper of this seal is known as the lord privy seal (*q.v.*).

Prix de Rome (Fr., prize of Rome). Highest award given to students of the *École des Beaux Arts*, Paris, who show unusual talent in painting, sculpture, engraving, or architecture. Its bestowal carries admittance to the French academy at Rome, and a monetary allowance varying with the subject in which the candidate qualifies. The award is made every year for painting, sculpture, and architecture, and once in two years for engraving.

Prize Bounty. Monetary reward to those personally and immediately responsible for the capture or destruction of an enemy warship. It was legally authorised in 1649, when the rate of bounty was fixed at £20 per gun in the case of an admiral's ship, £16 if a vice-admiral's, and £10 for others. In 1708 the first Naval Prize Act fixed the rate at £5 per head of the people on board the hostile ship, and this rate still obtains. Prize bounty is payable only to those "actually present at the taking or destroying" of an armed enemy ship (Naval Prize Act, 1864), and this condition is rigidly enforced. In the case of fleet actions bounty does not, as a rule, realize much for the individual, but it provides a generous channel for rewarding the work of submarines. For instance, the B11, with a crew of only two officers and 14 men, was awarded £3,500 for sinking the Turkish battleship *Messudieh* in the Dardanelles on Dec. 13, 1914. Bounty is not granted in respect of troop transports unless they are armed. *See* Prize Money.

Prize Court. Court of law held in time of war. On the outbreak of a war involving hostilities at sea every country sets up a tribunal called a prize court, whose business it is to examine the validity of capture of ships and goods made at sea by the navy of its country. Such a court is really an international tribunal, and its decisions ought to be governed by international law, so that, theoretically, any question at issue would be decided the same way wherever it was tried. Each country, however, makes its own rules of procedure, but in England, at any rate, no rule is allowed to be made which will hamper the court in deciding cases according to international law, or which will result in any litigant being deprived of his rights under that code. The British courts of prize are constituted by commission under the great seal. In the British empire there is always an appeal to the judicial committee of the privy council. *See* Blockade; International Law.

Prize Fight. Term used for a pugilistic contest, fought with bare fists, for a money prize. Such are now forbidden by law in the United Kingdom, the U.S.A., and other civilized countries, and their place has been taken by contests in which boxing-gloves are worn. In England the age of prize fights was from about 1750 to 1850. The last great prize fight was the one between Sayers and Heenan in 1860. *See* Boxing.



Prizrend, Serbia. General view looking towards the old Turkish citadel

Prize Money. Net proceeds of the sale of enemy property and contraband lawfully captured at sea. Prior to the outbreak of the Great War the distribution of prize money was confined to those ships actually making the capture, and this led to large fortunes being amassed by fortunately placed officers. Thus, on May 21, 1762, H.M. ships *Active* and *Favourite* captured off Cadiz the Spanish vessel *Hermione*, from Lima, and the net proceeds in prize were £519,705 10s., resulting in the distribution of £65,000 to each captain, £13,000 to the lieutenants, and £484 to each seaman. In Aug., 1914, this system was suspended, and later one was substituted for it under which the whole prize money proceeds are paid into a common fund, in which every officer and man participates at the conclusion of hostilities.

For purposes of distributing prize money and prize bounty (*q.v.*) all ranks and ratings in the fleet are divided into classes, flag officers alone excluded. Flag officers share one-thirtieth of the whole, and one-tenth of the remainder is divided among captains and commanders serving as executive officers under them. The residue available for general distribution is then divided up in accordance with a scale by which every rank and rating receives a certain number of shares.

Prizrend or **PRIZREN.** Town of Yugo-Slavia, in Serbia. Situated on the E. edge of the Albanian Mts., the centre of a department of the same name (pop. 227,000 in 1914), it is about 60 m. E.N.E. of

Ušküb, and at one time was famous for its manufacture of weapons. Before the Great War it had a brisk trade, and a glass industry. It is the seat of a R.C. archbishop and a Greek metropolitan. In the first Balkan War it was occupied by the Serbs in Oct., 1912. During the Great War it was the scene of heavy fighting prior to the retreat through it of the major part of the Serbian army into the Albanian Mts. *en*

route to Scutari, Nov.-Dec., 1915. It was occupied by the Bulgars, Nov. 28, 1915, and reoccupied by the French about Oct. 12, 1918. Pop., in 1914, 21,600.

Proa (Malay *prahu*). Malaysian sailing boat. Both ends being built sharp, it can sail equally well in both directions, and it is fitted with an outrigger contrivance projecting a boat-like float to prevent capsizing. Rigged with large lateen-like sails, proas attain remarkably high speed, and are used in many parts of Polynesia. *See* Boat; Catamaran.

Probabilism. Doctrine or theory according to which no action is sinful when there exists the slightest probability that it may be lawful, or when it has the approval of a reputable teacher. The origin of the doctrine has been traced to the Greek Sophists and Jewish Talmudists, but it was first systematised among the Jesuits. Condemned by the Sorbonne, 1620, and disapproved by Alexander VII, 1665, and Innocent XI, 1679, the Jesuit-general T. Gonzales attacked it in his *Fundamenta Theologiae Moralis*, 1691, but it found a champion in Alfonso Maria de Liguori (1696-1787). The term is often used in connexion with cases arising in confession. *See* Casuistry.

Probability. Branch of mathematics concerned with the chance of occurrence of any one of a number of possible events, some one of which is bound to occur.

The theory of probabilities is of extreme importance in every-day affairs, notably in insurance questions, annuities, etc. The first

attempt to solve problems of chance was made by Fermat and Pascal in 1654, when they found what would be the final scores in an unfinished game of cards between two players of equal skill. Leibniz established the fundamental principles of the calculus of probabilities, and Cotes, a contemporary of Newton, wrote on a method of determining the most probable results from a number of observations. Demoivre, Lagrange, Laplace, and other leading mathematicians placed the theory on firm foundations.

The fundamental principle in probabilities is simply stated by Todhunter in his algebra as follows: If an event may happen in a ways and fail in b ways and all these ways are equally likely to occur, the probability of its happening is $a/(a+b)$ and the probability of its failing is $b/(a+b)$. Furthermore, if there are any number of events A, B, C , etc., such that one must happen and only one can happen, and suppose a, b, c , etc., to be the number of ways in which these events can respectively happen, then the probabilities of the events are proportional to a, b, c , etc., respectively. If, for example, there are three events, then A can happen in a ways out of $a+b+c$ ways and can fail in $b+c$ ways. Therefore the probability of A 's happening is $a/(a+b+c)$ ways, and of its failing $(b+c)/(a+b+c)$ ways, and so on for the other events.

As simple examples in the theory of probabilities the probability of drawing a white ball from a bag containing 7 white balls and 8 black balls is $7/15$, and the probability of throwing an ace first time with a die is $1/6$. See History of the Theory of Probabilities, I. Todhunter, 1865.

Probability (Lat. *probabilis*, capable of being proved). The likelihood of a statement or event being realized, the degree of confidence in its realization according to what we know at the moment. The term occupies an intermediate position between certainty and doubt. But whereas doubt is always subjective (referring to state of mind), and certainty sometimes objective and sometimes subjective, probability is always objective, indicating the character of things or of our judgements upon them. Probability may be calculated *a priori* (q.v.), from the nature of the case (as in games of chance), or by actually counting the number of instances.

Probats (Lat. *probatum*, something proved). Official proof of the legality of a will. In English law,

derived in this respect from ecclesiastical law, it is necessary for the will of a deceased person to be proved in the probate division of the high court of justice before it can be acted upon. That is, the judge or other officer of the court must be satisfied by proof that the document in question is really the will of the deceased. In the case of a will which appears to have been duly executed, and to which there is no opposition, the officials of the probate registry grant probate without trouble; but when there appears to be some irregularity in the execution of the will, or there is opposition by anyone interested, the matter comes before a judge in court. Probate can be granted by any officer of inland revenue in cases where the personal estate does not exceed £300.

When the will is admitted to probate, the original will is filed in Somerset House, and is a public document which can be inspected by anybody on payment of a small fee. The officials then make a copy on parchment, which is called the probate copy, and it is this (commonly called "the probate") which is always used, and is admitted everywhere as evidence of the will. In addition to the principal registry in London, the Court of Probate Act of 1857 set up 40 district registries throughout the country, where original wills proved locally are kept and are similarly available for inspection. Whenever a deceased person has property in England, his will must be proved in the probate registry, otherwise that property cannot be dealt with. See Administrator; Estate Duty; Executor; Will.

Probation. System in vogue in criminal courts for releasing delinquents without punishment during good behaviour.

In its beginnings in Great Britain the movement was not wholly successful. The Probation of First

Offenders Act, 1887, was restricted in scope, and provided no means of making probation really effective. Such means were first sought in the American courts, where probation officers were appointed to supervise offenders during their time of testing. So fruitful did the experiment prove that its methods were applied in the United Kingdom by the Probation of Offenders Act, 1907.

The measure gives discretion to judges and magistrates to release a prisoner on probation, instead of sentencing him straightway, whenever "the character, antecedents, age, health, or mental condition of the person charged," the trivial nature of his offence, or extenuating circumstances, warrant such leniency. He is bound over to be of good behaviour and to appear for sentence, if called upon, during a period not exceeding three years; and, if such a course seems advisable, he is placed under the care of a probation officer.

In dealing with young offenders, and with others who have been led into crime by sudden temptation, weakness of character, or adverse home conditions, the surveillance of a kind but firm officer proves invaluable. Should his charges, however, neglect this chance of reformation, the law is again invoked; they are recalled and sentenced for the original offence. See Borstal System; Criminology; Reformatory.

Probationer (Lat. *probatio*, test). Term applied to one undergoing trial for membership of a Church or other religious community; for election or call to a pastorate; or for admission to a profession, such as nursing. In Scotland, a divinity student admitted by a presbytery to trial as a preacher before ordination is called a probationer. See Presbyterianism.

Problem. Generally, any question for discussion and settlement. In geometry, it is a proposition in which some operation or construction is required, e.g. to construct a triangle on a given straight line equal in area to a given triangle. The most famous problem is that of the three bodies moving under the sole influence of their mutual attractions. The problem is soluble only for particular cases, and the general problem has defied solution by mathematicians. It is one of great importance in astronomy, and its solution would automatically solve many other problems of the solar system.

Proboscis Monkey (*Nasalis larvatus*). Species of monkey, found only in Borneo. It is distinguished by its long and bulbous nose, which in the adult male hangs down and conceals most of the



Proboscis Monkey of Borneo

mouth. In the female it is smaller, while in young specimens it is turned upwards. The monkey is about 30 ins. long in body, with a tail of about 26 ins. The hair is chestnut on the head and back, and yellow elsewhere. The face is naked, surrounded with a fringe of outstanding hair. These monkeys are usually found in large companies in the woods, but little is known of their food or habits.

Probus, MARCUS AURELIUS. Roman emperor (A.D. 276-82). A native of Pannonia, he entered the



Marcus Aurelius Probus, Roman Emperor
From a coin

in chief command. He proved an excellent ruler and an able general, defeating the Germans on the Rhine, and restoring order in Egypt and Gaul. He was preparing an expedition against Persia when he was murdered at Sirmium by his own soldiers, who resented the severity of his discipline.

Probyn, SIR DIGHTON MACNAGHTEN (1833-1924). British courtier. Born Jan. 21, 1833, he entered the army in 1849, and saw service in the Indian Mutiny, 1857-58, winning the V.C. in the latter year. He also served in China, 1860, and on the North-West frontier, 1863. Equerry to the Prince of Wales (Edward VII) 1872-77, he remained in his service in various capacities until the king's death, 1910, when he continued as comptroller to the household of Queen Alexandra. Knighted in 1876, he died June 20, 1924.



Sir Dighton Probyn, British courtier

Procedure (Lat. *procedere*, to go forward). Legal term for the manner in which suits, actions, and prosecutions are conducted in courts of law. Procedure is regulated in courts of common law by the Common Law Procedure Acts of 1852, 1854, and 1860; in the high court and court of appeal by the rules of the supreme court, supplementing and supplemented by various Judicature Acts; and in equity by Chancery Acts and orders. See Parliament

Process. Term in English law denoting the various steps taken in legal proceedings, such as the issue of a writ of summons, the issue of a writ of execution, and the like. When legal proceedings are taken which are found to be, on the face of them, not taken for the purpose of establishing a legal claim, but merely to vex and annoy the defendant, or to compel him to pay money or damages when obviously none are claimable, the court will summarily dismiss such proceedings, on the ground that they constitute an abuse of process of the court. The jurisdiction to stop such proceedings is inherent in all courts, and is based on principles of elementary justice. In Scots law process is a summary warrant for imprisonment issued on the application of the clerk of court against a party who refuses to return a process borrowed from the court.

Process Engraving. General term embodying all processes of photo-mechanical reproduction, i.e. making of printing surfaces, blocks, or mechanically-engraved plates by photographic agency. It supplanted the wood block engraver in the case of letterpress relief printing; by its means photographic printing has only become possible as produced to-day, and in the practice of lithography its adoption has resurrected a method of colour printing that began to show signs of obsolescence in favour of the first two.

Excluding mammoth posters, the aid of process engraving is evoked in some manner or other for all modern illustrations and reproductions; it is the initial stage whereby it is possible to duplicate a subject or a photograph in hundreds of thousands; excepting the hand-drawn colour diagram facing page 4917 in this Encyclopedia, every single illustration, map, colour-plate, also the cover, has been duplicated from the original by process engraving in a fraction of the time and at a tithe of the cost of the wood engraver or the lithographic draughtsman. See Colour-printing; Half-tone; Intaglio; Lithography; Newspaper; Photo-lithography; Printing.

Procession (Lat. *processus*, proceeding). Term used for a march or progress of a ceremonial kind, e.g. in the United Kingdom the procession of the king and his train to open Parliament. It is used for the march of any organized body, but usually suggests an occasion of rejoicing.

Processions, which were very elaborate among the Greeks and Romans, have always played a

great part in religious ceremonial. They were introduced into the Christian Church at an early date, and are still generally used in the Roman Catholic and Greek churches. The Roman Catholic Church lays down rules for processions which are held on feast days and other occasions. They frequently take the form of an ordered march through the town or village, the cross and sometimes the host being carried.

The reformed churches make far less use of this form of ceremonial, which was to a great extent abolished at the Reformation. Processions exist, however, in the Lutheran Church, especially funeral processions. In the Church of England, too, the funeral procession has always been recognized. The Oxford Movement led to the revival of other processions, and to-day in most episcopal churches the clergy and choir enter and leave the church in procession, sometimes carrying the cross, in high churches with a more elaborate ritual. The hymn sung on these occasions is called the processional hymn.

In theology, the procession of the Holy Ghost is the emanation of the Holy Spirit from God. In the U.S.A. processioning is the term used for a periodical survey of boundaries, the official charged therewith being the processioner. See Pageant.

Procida (anc. *Prochyta*). Small island at the N.W. end of the Bay of Naples. It lies between Cape Miseno and Ischia, 12 m. S.W. of Naples. Of volcanic origin, its outline is very irregular; its length is about 2 m. The vine is cultivated and fruit is grown; coral is also produced. The neighbouring waters are prolific in tunny and sardines. The town of Procida, on the E. coast, has a castle, now used as a prison, and a royal palace. Procida was occupied by the British during the Napoleonic wars. It is said to have received its ancient name from having been formed by eruption from Vesuvius (Gr. *prochyptos*, poured forth). Pop. (town) 4,600.

Proclamation (Lat. *pro*, before; *clamare*, to cry aloud). Public announcement by royal authority of anything which the sovereign thinks proper to notify to the people. By extension the word is used of that which is so advertised, a public ordinance.

Proclamations emanate from the king in council, are issued under the great seal, and are read aloud in the capitals of the united kingdoms by the heralds, preluded by a fanfare of trumpets, and by other specially

appointed officers elsewhere. They are always issued on the demise of the crown and the accession of a new sovereign, and on declaration of war. In times of war and other emergency they contain the instructions of the executive government with regard to the duties and liabilities of the people. Thus, for example, they may order reservists to rejoin the colours, or call upon well-disposed citizens to cooperate with the authorities in repressing seditious or revolutionary action by ill-disposed members of the community.

In normal times they are concerned with the dissolution or prorogation of parliament, with the calling and adjourning or discharge of certain courts of law, and the like. Proclamations are binding only when issued to enforce the execution of existing law. Attempts made by Henry VIII to give them the effect of statute law, and thus to set the will of the sovereign above the authority of the legislature, were defeated by parliament in the reign of Edward VI, and proclamations are thus the utterance of the legally constituted executive authority.

Proclus (A.D. 410–485). Neo-Platonist philosopher. Born at Constantinople, of Lycian descent, he studied at Athens, where he succeeded Syrianus as head of the Neo-Platonist school. A violent opponent of Christianity, he is chiefly important as having rigidly systematised the doctrines of his predecessors. He was in the main a follower of Plotinus, although more of a mystic; but some of his views in regard to the divine unities and the intelligible are new. In addition to commentaries on certain dialogues of Plato, he was the author of mathematical and astronomical works. It is uncertain whether he was the author of a Grammatical Chrestomathy, the only source of our knowledge of the so-called epic cycle, considerable extracts of which are preserved in the Bibliotheca of Photius. See Homer; Neo-Platonism; Plotinus.

Proconsul. Magistrate of ancient Rome invested with the power of a consul, and charged with the command of an army or the administration of a province. In the later republican period the wide powers or *imperium* granted to proconsuls were often shamefully abused. See Consul; Rome.

Procopius. East Roman emperor, A.D. 365–6. Born in Cilicia, he was a kinsman of Julian the Apostate, who made him joint commander of the army in Mesopotamia, and is said to have in-

tended him to be his successor. On the accession of Valens (364), Procopius, finding his life in danger, fled to the Bosphorus, crossed over to Constantinople, and, favoured by popular discontent, was proclaimed emperor. Valens at first thought of abdicating, but, after two severe defeats in Phrygia, Procopius, abandoned by his army, was captured and beheaded.

Procopius (c. A.D. 540). Byzantine historian. Born at Caesarea in Palestine, and trained as a lawyer, he acted as secretary to Belisarius in several of his campaigns, and seems to have found favour with the emperor Justinian, who appointed him prefect of Constantinople in 562. He wrote histories of the Persian, Vandal, and Gothic Wars, and a work on the public buildings erected by Justinian, but his most interesting work is his *Secret History*, a sort of *chronique scandaleuse* of the court of Constantinople from 549 to 562, containing an attack on the Empress Theodora. There is a translation, by H. B. Dewing, in the Loeb Classical Library, 1914–19.

Procrustes (Gr., the stretcher). In Greek legend, the nickname of Polypemon, a robber of Attica, killed by Theseus. He boasted that he had a bed which fitted everyone, and made good his boast by stretching the limbs of those victims who were too short, and cutting them off in the case of those who were too long for the bed. Procrustes and his methods have become a proverbial expression for attempts to make everyone conform to one standard.

Procter, ADELAIDE ANN (1825–64). British poet. She was born in London, Oct. 30, 1825, a daughter of Bryan



Adelaide Procter,
British poet

Waller Procter, better known as Barry Cornwall (*q.v.*). Her poems, collected as *Legends and Lyrics*, 1858–60, and issued with an introduction by Charles Dickens, include *The Angel's Story* and *The Legend of Provence*, and such well-known lyrics as *The Lost Chord*. Two popular hymns by her are: *I do not ask, O Lord, that life may be; My God, I thank Thee*. Miss Procter, who was much interested in the movement for the emancipation of women, died of consumption, Feb. 2, 1864.

Procter, BRYAN WALLER. British poet, better known under his pen-name of Barry Cornwall (*q.v.*).

Proctor. One who manages the affairs of another. It is a contracted form of procurator. The king's proctor is an official entitled to intervene in a divorce or nullity suit where collusion or fraud is suspected. At Oxford and Cambridge the proctors are two university officials whose duties include that of maintaining discipline. They hold office for only one year. The sworn special constables who accompany them on their nightly rounds are known as "bulldogs." The representative of certain ecclesiastical bodies in Convocation (*q.v.*) called a proctor.

Proctor, RICHARD ANTHONY (1837–88). British astronomer. Born at Chelsea, London, March 23,



R. A. Proctor,
British astronomer

1837, he was educated at King's College, London, and S. John's College, Cambridge. He early took an interest in astronomy, and wrote many articles on the subject. His book, *Saturn and his System*, published 1865, established him as a popular scientific writer. He followed it with *Half-Hours with the Telescope*, 1868; *Other Worlds than Ours*, 1870; *The Orbs Around Us*, 1872; *The Poetry of Astronomy*, 1880; and other books, which did much to popularise astronomy. Proctor was a very able lecturer on his subject, and several times toured America, where he settled in 1884. The founder of the well-known scientific monthly, *Knowledge*, Proctor died in New York, Sept. 12, 1888.

Procuration. Term for the providing of women for the purpose of illicit intercourse. In England, the Criminal Law Amendment Act of 1885 was directed mainly against the trading in women and girls disclosed by W. T. Stead's investigations. This statute imposes heavy penalties for procuring any girl or woman who is not of known immoral character, either to have illicit relations with any person, to become a prostitute, or to become an inmate of a house of ill-fame. It deals also with the offence of administering drugs, or using threats or false representations for the purpose of procuration. Where there is reason to suspect that a woman is detained in a disorderly house, magistrates are empowered to grant a search warrant. The Act of 1885 was amended by the Criminal Law Amendment Act, 1912. See Prostitution; White Slave Traffic.

Procurator (Lat. *procurare*, to take charge of). An authorised agent, especially one who conducts legal business for another, and is his accredited representative. In Rome under the empire, the title was held by governors of provinces, and also by the officer, corresponding to the modern collector, who had the management of the imperial revenues in a province. Procurator is the technical term for an attorney to conduct an action by law, and in Scotland is the usual designation of the legal representative of a litigant in the inferior courts. The faculty of procurators in Glasgow was incorporated by charter in 1796, supplemented by a charter in 1897. It fixes the professional fees of procurators and undertakes the auditing of their accounts.

Procurator-fiscal. In Scottish law, title of the public prosecutor in the sheriff courts. He is the sheriff's chief executive officer for his particular district, makes investigation of criminal charges, performs a coroner's duties by inquiring into causes of suspicious deaths, prosecutes cases indicted before the supreme court of judiciary, and is responsible to the sheriff and the lord advocate. He carries out also those duties which in England come within the scope of the grand jury. He can order the arrest of anyone, and no action for wrongful arrest lies against him unless malice can be proved. Generally an enrolled law agent, his appointment is made by the lord advocate.

Procyon OR THE LESSER DOG STAR. One of the bright stars situated in the constellation of Canis minor. The star is remarkable for being one of the nearest stars to the earth, having a parallax of '32", and for its proper motion. It is approaching the sun at the rate of nearly 200 m. a minute. In 1896 it was discovered to be a double star.

Prodicus (c. 480-400 B.C.). Greek sophist. A native of Iulis in the island of Ceos, he early came to Athens, where his rhetorical gifts gained him the friendship of all the distinguished men of his time. One of his speeches contains the well-known apologue of the Choice of Hercules, of which an abstract is preserved in the Memorabilia of Xenophon. Hercules is represented at the parting of the ways, where he has to choose between Virtue and Vice, who plead their cause in the form of two women.

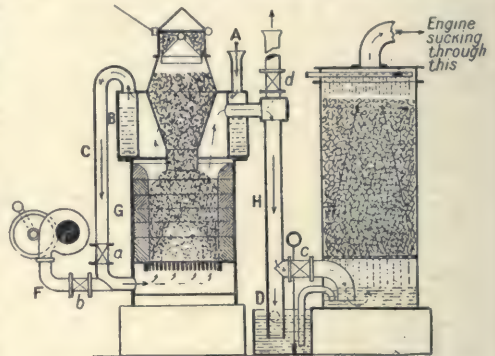
Producer-Gas. Gas produced in a furnace provided with means for admitting fuel at the top without allowing gas to escape. The

fuel is kept aglow by passing air through it as well as steam, the combustion of the oxygen from the air supplying sufficient heat to offset the cooling effect of the dissociation of the steam. At the bottom of the furnace complete combustion takes place, and carbon dioxide is formed. As this gas rises through the fuel above—which its formation keeps at a bright red heat—it is reduced to carbon monoxide. At the top of the furnace the carbon monoxide mixes with the free hydrogen from the steam and any volatile gases driven off from the fuel before it became incandescent. Producer-gas of this class is necessarily poorer in hydrogen than water-gas, and contains, also, a large proportion of nitrogen from the air. Its calorific value is, therefore, low as compared with that of coal-gas, but this fact is more than counterbalanced by the difference in cost. Its introduction, by J. E. Dowson, in 1878, has had great effect on the development of gas engines and gas furnaces.

Where producer-gas is required in comparatively small quantities for engines, a compact form of producer is employed, and the air and steam are sucked through the fuel by the movements of the engine's pistons. In other words, induced draught is substituted for forced draught. Above is a diagrammatical representation of a suction gas-producer, as this form of apparatus is called, the gas being known as suction gas.

G is the generator with a feeder at the top, and a water-sealed ash-pit at the bottom. Round the top runs a closed annular cast-iron trough which acts as boiler. The boiler communicates with the ash-pit by pipe C, which has a branch, F, running to a hand-driven ventilating fan. Pipe H connects the furnace with the dust-catcher, D. To start the apparatus, a fire is lighted in G and blown up by the fan, cocks *a* and *c* having been closed, and cocks *b* and *d* opened. In about ten minutes good gas is being produced, so cock *d* is shut and *c* is opened. The gas now passes through the system to an auxiliary vent near the engine, clearing out any stale gases. Blowing is continued for a short time after the engine has been started

up, and *a* can then be opened and *b* shut. Air drawn in at A by the suction of the engine passes over the surface of the water in B, and absorbs moisture before traversing C to the ash-pit. The gas formed in the producer is sucked into the



Producer-Gas. Sectional diagram of a suction gas-producer. See text

dust-catcher, where the heavier dust is deposited in a water-sealed pit. The finer dust is removed in the scrubber while passing up through coke, kept wet by water sprayed on it from the top. The gas then goes to the engine.

Blast furnaces give off a type of gas known as blast-furnace gas. The gas is very poor in hydrogen (7 p.c.), and fairly rich in carbon monoxide (23 p.c.), containing also 9 p.c. of carbon dioxide. Though the poorest of all producer-gases, it is produced in such vast quantities in the ordinary course of iron-smelting that the furnaces of Great Britain alone give off sufficient to develop 4,000,000 h.p. continuously. It has long been employed in the stoves which heat the air blast, and for running the boilers supplying steam to blowing engines, though dust and carbonic dioxide render it somewhat inefficient for the latter purpose. In 1894 B. H. Thwaite discovered that, if thoroughly freed of dust, it is a good fuel for gas engines, and it is now used on a large scale for driving blowers and generating electric power.

The Mond process of gas-making is very economical because it uses the regenerative principle of heating, and can use small slack and other waste fuel of very low value. In the Mond process ammonia is recovered in the form of sulphate of ammonia, and the sale of this as artificial manure goes a long way towards paying all working expenses. The air supplied to the furnace is heated and moistened by passing through a heating tower, in which it comes into contact with water that has been pumped from

a gas-cooling tower, to which it afterwards returns. A further transfer takes place at regenerators near the furnaces, where the air passes through tubes exposed externally to the hot gas coming off from the fuel. The air, mixed with sufficient steam to keep the working temperature low, is blown through the generator. The gases, on leaving the furnace, traverse air-heating regenerators and then enter a washer, wherein dust and tar are removed. The next process—ammonia recovery—takes place in a chamber in which the gas is subjected to a spray of dilute sulphuric acid, with which the free ammonia combines. The liquid is drawn off at intervals and evaporated till crystals of sulphate of ammonia form. The producer-gas is cooled in towers filled with a chequer-work of bricks and tiles, down which water trickles, and is finally cleaned in a mechanical scrubber, if intended for use in gas-engines. See Water-gas.

Production (Lat. *producere*, to bring forth). Term used, especially in connexion with economics, for the creation of wealth. It is one of the main processes in economics, the others being distribution and consumption. See Capital; Labour; Wages; Wealth.

Proetus. In Greek legend, the twin brother of Acrisius (*q.v.*). After a struggle he secured part of his kingdom of Argolis. His three daughters were driven mad by Dionysus or Hera, who according to one story imagined themselves to be cows, and were chased through the country, one dying and the others being cured. Perseus, to avenge Acrisius, turned Proetus into stone. See Bellerophon; Perseus. *Pron. Preetus.*

Profanity (Lat. *profanus*, outside the temple, unholy). Term used for blasphemous or irreverent language. See Blasphemy.

Professionalism. Term applied to the system under which exponents of games employ their skill as a means of livelihood. It is thus sharply opposed to that displayed by the true amateur, who plays for sheer love of the game or sport without thought of material recompense. Professionalism is no new phenomenon. The Roman gladiator risked his life in the arena as a professional fighter, to whom success brought money as well as reputation; and the Greek culture of the body did not wholly exclude the element of professionalism. Indeed, there have been few civilizations or countries in which prowess at arms or in some form of sport could not claim substantial reward.

In modern times, however, the term professionalism has acquired a fairly definite meaning, though in some cases the distinction between a professional and an amateur may seem to be rather finely drawn. The latter half of the 18th century in England marked the growth of rivalry and popular interest in sport and games, which has since developed to an amazing and almost disconcerting degree. Professional pugilists fought with bare knuckles in contests of endurance under the critical gaze of sportsmen who were their pupils in the noble art, and the loser did not, as in recent years, receive a handsome *douceur* after recovering from the knock-out blow.

Cricket was then on the road to becoming the national game, but, as in football, the amateurs showed the way, and professional players were a later development. To-day the Rugby game is still largely confined to amateurs, while in first-class Association football amateurs and professionals rarely meet. In cricket amateurs hold their own, though many county teams contain a majority of professionals. The universities, fed by the public schools, are the homes of amateur sport, and the 'Varsity boat race still affords an instance of the amateur spirit at its best. But whether professionalism on the whole has a good or bad influence upon sport, it has come to stay, and must be reckoned with. The best professionals "play the game" as well as any amateur, and are rightly honoured for their achievements. But professionalism in some aspects leaves a good deal to be desired, and for this the public is more or less responsible. See Amateur; Football.

Professor. Term used for a teacher in universities and institutions for higher education. The word came into use in the universities of the Middle Ages, and is now the general term for those who fill the chief positions therein. Nearly all professorships are endowed, and the office is often spoken of as the chair. At Oxford and Cambridge many professorships are held in conjunction with college fellowships. Most professors are appointed by the university authorities, but the regius professors at the older universities are appointed by the crown. About 1500 the first professorship was endowed at Oxford, and later Henry VIII endowed several regius professorships at both Oxford and Cambridge. Every university and college has now a staff of professors. The title is also assumed by teachers of dancing and other

arts, some being without academic qualification. A professor emeritus is one who has resigned after long service or through age or ill-health. See University.

Professor at the Breakfast Table, THE. Second series of Oliver Wendell Holmes's philosophical and humorous talks over the Breakfast Table. After appearing in *The Atlantic Monthly* it appeared in book form in 1860.

Professor's Love Story, THE. Modern sentimental comedy by J. M. Barrie. It was produced, June 25, 1894, at the Comedy Theatre, London, where it attained a run of 144 performances. The story is concerned with Professor Goodwillie, a middle-aged savant, who to his own bewilderment falls in love with his typist. E. S. Willard scored one of his greatest successes as the Professor.

Profit à prendre (Fr., profit to be taken). Old English law term. Dating from the time when the official language of the English courts was Norman-French, it denotes the right to enter on the land of another and take something therefrom, *e.g.* to cut turfs for one's own use, or to fish in another's pond. A *profit à prendre* may either be personal or annexed to an estate.

Profiteering. Term which came into use during the Great War to describe the undue raising of prices, resulting in exorbitant profits to persons engaged in the manufacture, distribution, and sale of commodities. Broadly speaking, a profiteer is one who takes advantage of a national crisis to enrich himself at the expense of the country, *i.e.* the taxpayer, or the individual consumer.

During the Great War, when the demands of the fighting forces had to be satisfied at any cost, profiteering, deliberate and involuntary, was tolerated, and it was not until Aug., 1919, that the Government introduced a bill to check profiteering. This empowered the board of trade to investigate complaints of "unreasonable" prices, and, if necessary, take proceedings against the seller before a court of summary jurisdiction, the offender being liable on conviction to a fine not exceeding £200, or to imprisonment for a term not exceeding six months. The bill also authorised the establishment of local committees and appeal tribunals. Action was limited to articles mentioned in schedules issued from time to time.

Under the Profiteering Act, 1919, and subsequent Acts, the local committees in Great Britain

considered 4,646 complaints, of which 3,413 were dismissed, and only 18 cases came before a court of summary jurisdiction, 12 of which succeeded. On the whole, the Acts were mainly useful indirectly by checking excessive prices, which in many instances were due, in part, at least, to the extravagant habits fostered in the public by war conditions. They came to an end on May 19, 1921, but not before important inquiries had been held into the operation of trusts and manufacturing costs, etc. Similar attempts to check profiteering were made in France and Italy. *See* Excess Profits; Forestalling; Regrating.

Profits (Lat. *profitus*, advance or progress). In trade or commerce, the monetary gain derived from the employment of capital in business. The term is also used of the difference between the buying and selling prices of goods, or between the cost of production and the selling price. Gross profits are subject to various deductions before the true or net profits can be ascertained. According to some political economists, *e.g.* John Stuart Mill, in an advanced state of society profits tend to fall to a minimum, the process being, however, retarded by improved methods of production, greater transport facilities, the importation of cheap raw material, etc. A prolonged state of war brings many opportunities of making large profits, and the following depression in trade results in heavy losses to both capital and labour. *See* Book-keeping; Capital; Excess Profits Duty; Political Economy.

Profit-Sharing. System of industrial management by which the persons engaged in a business or industry receive some proportion of its profit according to a pre-arranged scale. In the strict sense, profit-sharing is distinguished from similar schemes of common ownership and management by the workers, in that the relative positions of employer and employed are unaffected by the sharing of the surplus; at the same time profit-sharing is based on a definite agreed scale, part of the understood contract between master and worker, and does not include schemes of bonus distribution, beneficent endowments, etc., which are dependent on the goodwill of the employer.

Most profit-sharing schemes have grown from the idea that the profits of a business will be materially increased if the employees are given a direct interest in avoiding waste and in maintaining high standards of efficiency. The first

large profit-sharing concern was that of the French house-painter, E. J. Leclaire (1801-72), whose business, employing 758 men in 1870, had 1,277 in 1912, and in that year was distributing a share from total profits of 19½ per cent. on regular wages. In Great Britain profit-sharing has taken its firmest hold in gas-making concerns. In 1919 the ministry of labour reported on 116 schemes in full operation in the United Kingdom, others projected or lately begun not being reported upon. The total number of persons entitled to share was 80,758, the average per capita bonus amounting to £4 8s. 10d. The total amounts paid in 1919 amounted to £400,000.

Systems of sharing vary widely, and among the difficulties that they have to face are the arrangements for meeting a debit balance on the year's trading, change of ownership of businesses, and problems of common management or co-partnership. It has met with comparatively small support from socialist thinkers, because it is regarded by them as a palliative rather than a cure for deep-rooted evils, leaving the wage system untouched, and because certain schemes in operation, *e.g.* that of the Ford motor works, Detroit, have imposed conditions on the private lives of the workers outside the factory. *See* Co-partnership; Wages; consult also Co-partnership and Profit-sharing, Aneurin Williams, 1913.

Profligate, THE. Modern drama by Arthur Pinero. It was produced April 24, 1889, at the Garrick Theatre, London. The first of Sir Arthur Pinero's plays to deal with sex problems, its most powerful situation is that in which a wife on her honeymoon tour discovers that a girl whom she wishes her husband to befriend has been his mistress. Forbes-Robertson, Kate Rorke, and Olga Nethersole played the leading parts in the piece.

Prognathism (Gr. *pro*, before; *gnathos*, jaw). Term denoting the projection of the upper jaw, especially in man and the anthropoid apes. In one method, a base line being drawn from the forehead to the chin-point, the angle formed by the jaw, or maxillary angle, ranges from 160° in Europeans to 140° in the African negro. It is 110° in orang-utans. The European face is called orthognathous, the negro prognathous. *See* Anthropology; Man.

Prognosis (Gr., foreknowledge). Opinion expressed by a doctor as to the prospect of recovery from a disease. *See* Medicine.

Programme (Gr. *pro*, before; *gramma*, a writing). Written outline of items or events in a function or ceremony. The word is generally applied to the list of items in a musical or theatrical entertainment. In political usage, it has been extended to mean the details of the policy, which a given party or individual intends to put into practice.

Programme Music. Name applied to musical compositions which are designed to suggest to the auditor a definite series of events or scenes. This class of composition has reached mature development only in modern times, but early composers frequently imitated the songs of birds, battle-cries, etc., to add descriptive force. Beethoven himself used the notes of the cuckoo in the Pastoral (No. 6) Symphony, and declared that his composition was always based on mental pictures. But the term should be confined to works where the "literary" basis is clearly defined, *e.g.* the popular Battle of Prague, for piano and strings, by Franz Kotzwara (d. 1791), or on higher planes, Mendelssohn's Midsummer Night Overture, Schumann's Carnival, many orchestral works of Berlioz, an enthusiast of the programme in music, Liszt's symphonic poems, Saint Saëns's Danse Macabre, Richard Strauss's Don Quixote. *See* Leit Motiv.

Progress and Poverty. Work on social philosophy by Henry George (*q.v.*), further described as An Inquiry into the Cause of Industrial Depressions and of the Increase of Want with the Increase of Wealth, the Remedy. Published in 1879, it finds the principal cause of poverty and wretchedness in the private ownership of land, and advocates a single tax on the use of land as the remedy. *See* Single Tax.

Progression. In mathematics, the name given to a particular kind of series. Arithmetical progression is a series in which the difference between one term and the previous one is constant. In a geometrical progression each term is a constant multiple of the previous term. *See* Series.

Progression. In music, the movement of one part of a composition towards the succeeding part. In the most elementary sense it denotes the motion of each note to the next; in a more advanced sense it means the motion of a set of notes (*i.e.* a chord) to the following set; in a still higher sense it is used to describe the movement of music from one point to another, especially in connexion

with modulation. "Progression of parts" is a term used in respect to the relative motion of the various parts.

Progressives. Name applied to one of the parties on the London County Council since its foundation in 1889. Composed of men holding advanced views, it was opposed by

the Moderates, later the municipal reformers. The Progressives obtained a majority at the elections of 1889, 1892, 1898, 1901, and 1904, and were equal to the moderates in 1895. In 1907 and at later elections they were beaten by the municipal reformers. See London.

PROHIBITION: NATIONAL AND LOCAL

F. A. McKenzie, Special Correspondent in America

In addition to this historical sketch of prohibition the reader is referred to the articles Licensing Laws; Liquor Control; Temperance. See also Johnson, W. E.; United States: History

The movement for the prohibition of the manufacture and sale of alcoholic liquors for beverage purposes originated in the eastern United States. A committee of the Maine legislature recommended in 1837 that "the law giving the right to sell ardent spirits should be repealed [and] a law should be passed to prohibit the traffic in them, except so far as the arts or the practice of medicine may be concerned." Neal Dow led a vigorous campaign, and as a result the first Prohibition Act—an experimental measure—was passed by the Maine state legislature in 1846. It dealt only with spirits and was an admitted failure. Five years later, Dow, then mayor of Portland, Maine, formulated a more rigid law prohibiting alcoholic drinks of any kind. This was rushed through the state legislature in two days, and at once strictly enforced.

Attempted Legislation in 1855

The idea was being debated in other states, and by 1855 prohibition laws had been carried in New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, Pennsylvania, Delaware, Indiana, Michigan, Iowa, and Nebraska. There came a reaction in 1856. In Maine a riot at Portland, when the crowd attempted to seize some confiscated liquor and a man was killed, so influenced public opinion that the law was repealed there, but it was re-carried two years later. In New York, Indiana, and other states, prohibition was declared unconstitutional—a judicial decision later repealed. In some states the law was not enforced. In a very short time prohibition was repealed or a dead letter everywhere, except in Maine, New Hampshire, and Vermont.

In the early eighties the crusade was revived in the Middle West, and prohibition was adopted in the state of Kansas by a very small majority. The reformers, learning from experience, now adopted the policy of securing an amendment

to the constitutions of the different states, thus preventing its being repealed by temporary party majorities. The state of Kansas still remains an outstanding example of the favourable operation of the law. In Iowa, which quickly followed the example of Kansas, the result was not nearly so satisfactory, and prohibition was temporarily suspended, an extraordinary measure known as the Muley law being put in its place. This law was framed to meet the requirements of localities where open saloons still existed in spite of all efforts to close them. The state legislature refused to license these saloons or to legalize the traffic, but it provided that any persons who kept saloons in spite of their being prohibited should put up bonds, and conduct the saloons under strict conditions. This law was later on repealed, and prohibition re-enforced.

The prohibitionists made steady progress, mainly in the middle and far west, but they soon found that the passage of prohibitory acts or constitutional amendments was only the commencement of the fight, for continuous struggles had to be maintained to prevent the law from becoming a dead letter.

Anti-Saloon League

The liquor question became more and more the main issue in state elections. One section of the prohibitionists established an independent political party of their own and nominated candidates for the presidency without much success. A more efficient organization, the Anti-Saloon League, was formed in 1898, which disavowed any political purpose except the prohibition of the liquor traffic. It soon became the centre of activity throughout the Union.

The cause underwent developments which greatly increased its fighting strength. Started mainly as a moral crusade, it gradually won the support of the big business interests, which had become convinced that the absence of alcoholic drinks added to the efficiency

of industrial life and increased general prosperity. State after state was won between 1912 and 1917, and no fewer than twenty-seven states out of a total of forty-five—including the whole of the West, except California, and nearly all the South—carried prohibitory laws.

Effect of Great War

The reformers, moving beyond the policy of securing prohibition by state legislation, organized in 1913, in cooperation with the Women's Christian Temperance Union, a committee of 1,000 to obtain a prohibition amendment to the constitution of the United States. To secure this, it would be necessary to secure first a two-thirds majority in congress, and then ratification by the legislatures of at least three-fourths of the whole number of states in the Union. The amendment was at first rejected by congress. The entry of America into the Great War still further strengthened the hands of the prohibition party, and on Dec. 17, 1917, a joint resolution was carried through congress by a vote of 282-128, for the submission of the amendment to the different states. This amendment, known subsequently as the "18th Amendment," declared:

"After one year from the ratification of this article the manufacture, sale, or transportation of intoxicating liquors within, the importation thereof into, or the exportation thereof from, the United States and all territory subject to the jurisdiction thereof for beverage purposes is hereby prohibited."

A strenuous campaign followed in the different states and by January 6, 1919, the necessary 36 states had approved of the amendment. Eventually every state except three, Connecticut, New Jersey, and Rhode Island, carried the amendment, and in most states the vote of the legislature in favour was overwhelming or unanimous. The amendment was not to come into force until Jan. 16, 1920, one year after ratification, but President Wilson hastened it by the passage of a war measure—which did not operate until the war was many months old—prohibiting the sale of drink throughout the United States from July 1, 1919.

From that date the United States has been under absolute prohibition. The results are a subject of acute controversy. A considerable amount of drinking still goes on in parts of the United States. Many people accumulated private cellars of wines and spirits before the law came into effect, which they are legally allowed to

retain and use. The enormous stocks in the hands of the distillers and others which were taken over by the government and retained for medicinal or mechanical use have largely been illegally distributed, often with the connivance of the officers in charge of them. A considerable amount of smuggling of spirits over the Canadian border is carried on, and crude distillation by private stills is on the increase. The enforcement of the law is at its worst in great eastern cities like New York. Over very large parts of the country, particularly in the Middle West, however, prohibition is as well enforced as any other law of its kind, and it has the active support of the Churches, and of a considerable majority of the people.

Introduction in Canada

Nearly the whole of the Dominion of Canada has adopted prohibition. The movement here was mainly in the beginning a campaign against the open saloon. The province of Prince Edward's Island abolished the liquor traffic in 1907, and Saskatchewan and Alberta in 1915. They were followed in 1916 by British Columbia, Manitoba, and Nova Scotia. By 1917 the whole of the Dominion, except the province of Quebec, had abolished the open liquor traffic, and in Quebec almost the whole of the province, outside the city of Montreal, was under prohibition by local option. The provincial laws, while they forbid the general sale of drink, could not prevent importation from one province to the other, or manufacture for the purpose of exportation beyond the province. So the individual consumer was able to import his private stocks from other parts, while the open sale in clubs, saloons, or hotels was illegal. The Dominion government made the law more severe by enacting a war measure, prohibiting for the period of the war, and for twelve months afterwards, the importation, manufacture, and sale, or the inter-provincial shipments of liquor for beverage purposes into territories under prohibition.

The enforcement of the law in Canada varied greatly according to the districts. In most places it was possible to obtain supplies of spirits at high prices by permits from doctors, even when the war legislation was most rigid. Many doctors did a large business in signing these permits, usually at a charge of two dollars each, and the different provinces made special provision for supplies required for medical purposes. The law was most satisfactorily enforced in Manitoba, Saskatchewan, Ontario,

and the rural parts of Alberta. In British Columbia, where there was strong opposition, it was enforced in some districts and almost ignored in others. Generally speaking, public opinion, even among those who themselves drank, was strongly in its favour. Its most active opponents declared that they would never have the open saloon back again; all they asked was the right of the private individual to secure private supplies, and the legalisation of the traffic in beer and light wines. The issue was again submitted to the electors in many of the provinces in 1920. The law was repealed in British Columbia; everywhere else it was re-enacted by very large majorities. Newfoundland carried prohibition as a war measure in 1917, but there was great opposition, and in 1920 the government formulated a plan for modification.

Attempts to carry general prohibition in Australia have not been successful. Votes on national prohibition have been repeatedly taken in New Zealand since 1911, but without success. In the election of April, 1919, a small majority was secured in favour, but the votes of the soldiers in Europe, which were subsequently counted, turned the scale.

Russian Legislation

In Russia, the tsar at the outbreak of the Great War ordered that all wine shops, beer saloons, and government vodka shops should be closed during mobilisation. In September, 1914, the sale of vodka and all other spirits was absolutely prohibited until the end of the war, and shortly afterwards the prohibition of the sale of vodka was made permanent throughout the Russian Empire. The Russian revolutionary government, under Kerensky, and also the Bolshevik government continued this policy of prohibition.

Prohibition has made but little headway in Great Britain, where, however, it is the chief policy in the programme of certain temperance societies. Its main advocacy has been from America, whose Anti-Saloon League has, from time to time, sent speakers to conduct a campaign, as in 1919-20 (see Johnson, W. E.). The movement has been warmly taken up in Scotland, where, under the Temperance Act of 1919, a poll may be taken of the inhabitants of a district as to whether licences be refused. This measure was regarded as an instalment of prohibition, but the polls taken in 1920 showed a heavy defeat of the prohibition party.

Prohibition. Writ by the common law of England, used also in America and all parts of the British

Dominions where English common law prevails. By it one of the superior courts (exchequer, common pleas, and king's bench) forbade an inferior court to take cognizance of a case. In England the writ is now, in practice, confined to cases where a county court, or the mayor's court, London, is assuming jurisdiction over a cause which it has no jurisdiction to try. The defendant applies to the king's bench division for a writ of prohibition, and the writ, on a *prima facie* case being made out, grants a rule *nisi* calling on the plaintiff to show cause why the writ should not issue. The case then comes on for argument; and unless the plaintiff can show that the inferior court has jurisdiction, the rule is made absolute, and the writ is issued, prohibiting the inferior court from going any further with the matter.

Projectile (Lat. *pro*, forth; *jacere*, to throw). Body which can be projected through air or space, and so can be used as a missile. The term is specially applied to missiles which are adapted to be discharged from guns, rifles, cannon, and similar weapons. See Ammunition; Bullet; Grape Shot; Incendiary Bullet; Incendiary Shell; Shell.

Projection. Term applied to the gratitudes or frameworks of lines of latitude and longitude upon which maps are drawn, and now used for any map network and not restricted to those which are true geometrical projections, e.g. Mercator's and simple conic projections. See Map.

Projector. In optics, any apparatus used for directing rays of light, e.g. a searchlight. A magic lantern is sometimes known as a projector. See Searchlight.

Prokop, ANDREW (1380-1434). Bohemian monk and Hussite leader. Born in Bohemia, he studied in Prague, and travelled extensively in Europe before becoming a monk. He joined the army of Jan Ziska on the outbreak of the Hussite war, and after Ziska's death in 1424 became general of the Taborites, who under his guidance won a series of victories over the Saxons, Germans, and Austrians. In 1427 he was master of Prague, and in fact of Bohemia. His followers carried out numerous devastating raids on neighbouring states, and in 1431 the war was renewed, and Prokop's army advanced as far as Frankfurt-on-Oder. After this campaign the Emperor Sigismund prepared to negotiate with the Hussites. On May 30, 1434, Prokop was defeated at Lippau by an army raised by the Bohemian aristocracy, and fell on the field of battle.

Prokuplie. Town of Yugo-Slavia, in Serbia. Situated on the Toplitza, a W. tributary of the Morava, it is about 15 m. S.W. of Nish. During the Great War it was taken by the Bulgarians, Nov. 16, 1915, and the Serbians recovered it from the Austro-Germans in Oct., 1918. Pop. 5,000.

Prolapse (Lat. *pro*, forward; *lapsus*, slip). In medicine, the sinking down of an organ of the body, as the uterus.

Prolation. Relation in early mensural music of the semibreve with the minim. A dot in the signature indicated greater prolation, and the semibreve was worth three minims. Without the dot, the prolation was lesser, the semibreve being worth two minims. See Mood; Signature; Time.

Proletariate (Lat. *proles*, offspring). Term used by political economists and socialists to signify the poorest and lowest class of a community, and recently extended to include all the wage-earners of a nation. It dates from the time of Servius Tullius, when the Roman state was divided into the classified citizens who had property (*locupletes*), and the unclassified who had not, but served the state with offspring instead. See Democracy.

Prologue (Gr. *pro*, fore; *logos*, word). Preface or introduction, more especially one spoken before the commencement of a dramatic performance, either to indicate its nature, or to commend it to the audience. The use of the prologue dates back to the classic dramatists, when all that preceded the first choral song was called *prologos*, and though it continued fairly general with new pieces in the English theatre up to the 19th century, it later dropped almost entirely out of use. Shakespeare's use of the prologue varied: that to Richard III gives virtually an exposition of the situation and character of the play; that to Romeo and Juliet is a descriptive sonnet; in that to Henry V the audience is called upon to imagine fit setting for the heroic scenes. Frequently a prologue was written by a friend of the dramatist as a kind of introduction of his work to the public. Dryden wrote, for instance, many prologues to other plays than his own. See Drama.

Prome. Dist. and town of Lower Burma, in the Pegu division. The dist. occupies the Irawadi valley just above the delta. It connects the Central Basin, the original home of the Burmese, with the deltaic plains, the ancient kingdom of the Talaings. Rice is almost the only cereal cultivated.

The town on the left bank of the Irawadi is the terminus of the rly. from Rangoon. It contains a noted pagoda much visited by pilgrims, and has an active trade in silk and cotton goods, lacquer ware, and paper. Area, 2,915 sq. m. Pop., dist., 379,000; town, 26,900.

Promethean Match. Device for obtaining fire quickly. It replaced the chemical matches which had come into use about 1807. It consisted of a small, tight roll of paper coated with sulphur, and containing at one end a sugar and potassium chlorate mixture, and a thin glass bulb filled with sulphuric acid. To obtain a light the glass was broken by pinching the end of the match, when the mixture fired owing to contact with the acid. See Bickford Igniter; Match; Safety Fuse.

Prometheus. In Greek mythology, originally a god of fire, later a Titan. The chief legend about

written 1819. Prometheus, the spirit of man, who has made Jupiter powerful and become his captive, revolts and is freed by the mysterious Demogorgon, who destroys Jupiter. Prometheus is re-united to his wife Asia, or Nature, and the new age of human freedom and happiness begins.

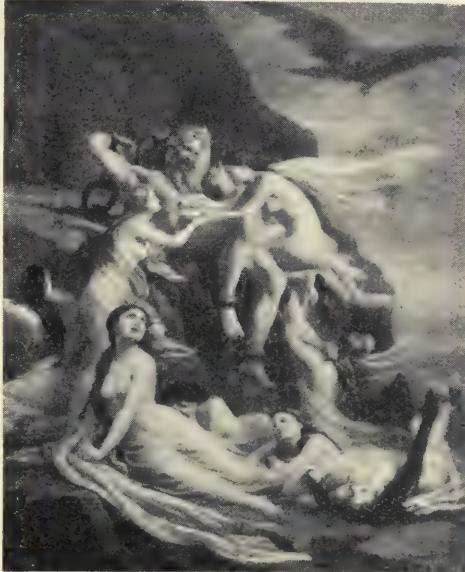
Prometheus Vincetus (Prometheus Bound). Tragedy by Aeschylus, produced about 430 B.C. It was the first, or second piece, of a trilogy, the other two being Prometheus the Fire-Bringer and Prometheus Unbound. For having taught mankind the rudiments of civilization, especially the use of fire, contrary to the will of Zeus, Prometheus was chained to a rock in Scythia, and predicted the dethronement of Zeus. At the end of the play the rock sinks with him, to the accompaniment of a terrible storm, into Hades, where he suffers further tortures.

Prominence.

In astronomy, the name given to the gaseous structures round the rim of the sun. They are great quiescent or eruptive gas clouds which reach in some cases 50,000 m. alt. and consist chiefly of hydrogen and helium. One prominence has been recorded as having attained a height of 350,000 m. See Sun.

Promise of

May, THE. Rustic drama in prose by Alfred Tennyson. It was produced, Nov. 11, 1882, at the (old) Globe Theatre, London. The introduction on the stage of a typical Freethinker in the person of



Prometheus chained to the Scythian rock, and consoled by ocean nymphs. From the painting by Zuber-Bühler

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him is that he stole fire from heaven for the use of mortals. For this he was chained by Zeus to a rock in Scythia, and every day an eagle consumed his liver, which grew again in the night. Prometheus suffered this torture until he was rescued by Hercules, who killed the eagle and released him from the rock. There are various and somewhat conflicting forms of the legend. See Aeschylus; Pandora. Pron. Pro-mee-thewss.

Prometheus Unbound. Lyrical drama by P. B. Shelley, by many considered his greatest work,

Edgar, provoked a public protest on the first night from the marquess of Queensberry. Hermann Vezin played Edgar, and Charles Kelly, Miss Ormsby, and Mrs. Bernard Beere were in the cast.

Promissory Note. "An unconditional promise in writing, made by one person to another, signed by the maker, engaging to pay on demand or at a fixed or determinable future time, a sum certain in money, to or to the order of a specified person or to bearer." The person making the promise is the maker or drawer. The person to

whom the promise is given is the payee or drawee. The usual form of such a note is:—

London, May 1, 1920.

Three months after date I promise to pay Mr. John Jones or order the sum of one hundred pounds for value received. £100.

(Signed) Septimus Smith.

As between the drawer and the payee, if the payee sues on the note, the drawer can always defend on the ground that there has been no valuable consideration, or use any other defence that would be open on an action of contract. But if the payee indorses the note to a third party, called indorsee, the latter can sue the drawer for the money without regard to the original want of consideration. Thus, a promissory note is negotiable. Speaking generally, a note which has once been indorsed to an indorsee has all the characteristics of a bill of exchange; and the drawer and all indorsers are liable to a holder in due course for its face value.

Promontory. General geographical term for a cape, as Cape Clear, headland, as Beachy Head, point, as Start Point, ness, as Buchan Ness. Promontories vary from sandy spits as Dungeness to the fractured ends of hill-ridges as the North and South Forelands, the eroded fragments of a ridge as the Needles, and to bluff headlands as the North Cape. See Geography.

Promoter. In a legal sense, one who is a principal, not a subordinate or other employee, who alone or with others forms or floats a company or undertaking. A promoter conceives the idea of the company, sets out a scheme, procures persons to act as the first directors, causes the memorandum and articles to be prepared, and undertakes to form a company with reference to a given project, and to set it going, and to take the necessary steps for that purpose.

It was declared in 1878 by Lord Chancellor Cairns that a promoter stands in the position of a trustee towards the new company, must act in the utmost good faith, and must not make a profit without disclosing it, and if he does make a secret profit, will be compelled to disgorge it. A promoter who issues a prospectus inviting subscriptions for shares is liable for fraud unless he shows that he honestly and reasonably believed in the truth of the statements therein contained. The Companies Act, 1908, s. 81, also makes it incumbent on him to see that the prospectus contains the information set out in that section. See Company Law.

Promptorium (Promptuarium) Parvulorum (Lat., storehouse of the young). The first

English-Latin Dictionary. Supposed to have been compiled about 1440 by a Dominican friar named Galfridus (Godfrey) Grammaticus of Lynn Episcopi in Norfolk, it illustrates the language of the period, especially the East-Anglian dialect, and contains numerous examples of medieval Latin.



Prong Buck. Young specimen of the small North American mammal
W. S. Berriidge, F.Z.S.

Promulgation (Lat. *promulgare*, to put before the people). In law, the steps taken to make a law known to those who have to obey it. In English law, everybody is deemed to know when a new law comes into operation, and promulgation is not necessary to its validity. See Proclamation.

PRONUNCIATION: RULES OF SPEECH

A. E. Gough, M.A., Ph.D., late of The Oxford English Dictionary

In this article are outlines of some rules which should serve as a useful guide to pronunciation. See also Consonant; Larynx; Phonetics; Voice; Vowel; and the articles on the letters of the alphabet, A, B, C, etc.

Pronunciation (Lat. *pronuntiare*, to utter) is the manner in which an individual or a linguistic group utters articulate words or sounds. There are four principal elements in pronunciation, viz. quantity or length; stress, accent, or loudness; intonation or tone; articulation. Quantity applies to consonants as well as vowels, but is more important in the latter. English **make**: a greater difference than many languages between long and short vowels. Stress depends on the volume of sound emitted at one time, and has nothing to do with the duration of the sound, although long syllables tend to acquire stress. It is very marked in English speech, and is often exaggerated by English speakers of other languages. Intonation includes the rising or falling in the musical pitch of the voice. Most European languages

Prong Buck (*Antilocapra americana*). North American ungulate mammal. It is usually placed by zoologists between the antelopes and the giraffes. Though only one species is known, it forms a separate family, the Antilocapridae. It resembles an antelope, but the horns consist of bony cores supporting sheaths which are periodically shed and renewed. The cores are covered with hairy skin, as in the giraffes. The animal is about 36 ins. high at the shoulder, and the pelt is handsomely coloured. The upper parts are chestnut; the face is almost black, with white cheeks; and the lower parts and a large patch on the rump are white. The white throat is crossed with brownish-yellow bars. The prong buck occurs only in the W. parts of N. America.

Pronoun (Lat. *pro*, for; *nomen*, noun). In grammar, a class of words used in place of a person or thing. They are divided into personal (I, you); demonstrative, indicating objects (this, that); relative (who, which); interrogative (who? which?); indefinite (any, either); possessive (mine, yours). The personal pronouns include reflexive (him-, herself, themselves), and reciprocal (one another). Many languages show a distinction of gender in the demonstrative, relative, interrogative, and indefinite pronouns, the others having no gender. See Noun.

agree with English in using falling tones for statements, and rising tones for questions, although Swedish employs rising tones very extensively.

Articulation is the production of distinct sounds by the organs of speech. Its scientific study belongs to Phonetics (*q.v.*). The present article is concerned with practical hints on the pronunciation of foreign words. Much greater space and the free use of symbols would be necessary for the precise and full treatment of the subject, and the following statements only indicate very roughly the characteristic sounds of some important languages. An ideal alphabet would have one symbol for each sound; 28 vowels and 32 consonants are not heard in standard English, which itself has about 31 sounds. All that can be done here is to omit

from consideration sounds of rare occurrence, to group together as one sound those which closely resemble each other, and to indicate the mode of formation of certain sounds, fundamentally different from any English sound. Where digraphs, i.e. combinations of two letters to express one sound, are used, it must be remembered that the sounds thus expressed are simple, e.g. *ay* is not *a+y*.

English spelling, especially in regard to its vowels, is much less phonetic than that of any of the other great European languages. English has also developed an unusually large number of obscure and mixed vowels, diphthongs, and glides. The English vowel system is confronted with a very different and tolerably uniform Continental vowel system, of which the purest types are to be found in Spanish and Italian. Important exceptions will be noted in their places.

It is usual, though by no means a universally followed plan, to spell in English books the proper names belonging to languages which use other alphabets than the Latin (including black letter), or which are not written at all, with English consonants and Continental vowels. If these are mastered there should be little difficulty in pronouncing names in modern Greek, Russian, Serbian, Bulgarian, and the various Asiatic and African languages, except for accentuation and for certain sounds, as in Arabic, Hindustani, and Russian, for which we have no equivalents.

ENGLISH VOWELS.		Continental
Long	Short	
ah <i>father</i>	a <i>arise</i>	a
ai <i>air</i>	æ <i>cat</i>	æ
aw <i>saw</i>	o <i>not</i>	(Swed. Å)
ay <i>date</i>	e <i>bell</i>	e
ee <i>peel</i>	i <i>pill</i>	i
oh <i>poker</i>	o <i>fellow</i>	o
ō (er) <i>hurt</i>	u (er) <i>summer</i>	ō
oo <i>blue</i>	u <i>put</i>	u
ü Ger. <i>über</i> , Fr. <i>du</i>	ü Ger. <i>äppig</i> , Fr. <i>tulle</i>	ü
English Diphthongs		Continental
i <i>fine</i>		
ow <i>now</i>		ai
oi <i>boil</i>		au
		oi

Of these vowels the only one that presents real difficulty, apart from niceties, is ü. It is the Continental i rounded, and may be pronounced by attempting to utter the *ee* of *peel* or the *i* of *pill* with the lips protruded and rounded as in *oo*. The sound is heard in Scottish and Devonshire forms of *good*. Nasalised vowels, common in French, Portuguese, and Polish, are absent from standard English, though heard in some forms of American English. In them the vowel coalesces with a following *m*, *n*, or *ng*, to form a single sound,

not a vowel followed by a nasal consonant. They are formed by leaving a slight opening between the lips (with *m*), or between the tongue and palate (with *n* and *ng*), thus allowing some of the air to pass through the mouth as well as the nose.

CONSONANTS. *Kh* is used in this article to denote both the guttural and palatal voiceless fricatives (or spirants) heard respectively in Ger. *ach* and *ich*. The former occurs in Scottish *loch*. One symbol suffices, as the difference is automatically produced by the following vowel. The sounds are formed by putting the tongue in the positions of *ahk*, *eek*, but not allowing it quite to touch the palate. *Gh* represents the voiced fricative corresponding to the guttural *kh*, as in Ger. *sagen*, and is formed as above, substituting *ahg* for *ahk*.

Th is reserved here for the voiceless fricative heard in *thick*, and *dh* represents the voiced sound in *then*. Similarly *zh* stands for the voiced sound in *pleasure*. *Ly* represents the palatal *l* spelt in French and Spanish *ll*, in Italian *gl*, and in Polish *l*. It is one simple sound, and not quite the *l+y* heard in English *million*, but is formed by placing the tongue in a position between those for *l* and *y*. In French, S. American Spanish, and Hungarian, it often passes into *y*. *Ng* is the simple guttural sound of *sing*. *N̄* is the corresponding palatal nasal, formed by pressing the tongue against the front palate, between the positions for *n* and *ng*. It resembles the *ni* in *senior*, but is one simple sound.

ITALIAN. The stress is generally on the penultimate, except when that syllable is short in Latin, when it is on the antepenultimate, as in the diminutives in *olo, ola*. Occasional stress on the last syllable is marked by a grave accent, e.g. *pode-tà*. The two vowels in diphthongs are separately pronounced. A doubled consonant is pronounced twice. C before *e*, *i*=tsh; cc before *e*, *i*=t+tsh; ch before *e*, *i*=k; g before *e*, *i*=j; g before *a*, *o*, *u*=j; gh before *e*, *i*=g hard; gl=rarely gl; gn=n̄; h is silent; j=Ital. short *i*; s initial or before a consonant=s; s medial before a vowel generally=z, sometimes s; so before *e*, *i*=sh; sch before *e*, *i*=sk; z=ts or dz, but sometimes=z.

RUMANIAN. *Â* nearly=ü; *ă*=short ô; *e* initial=short *y*; *ê*, *i* nearly=ü; *i* and *u* final are silent; *y*=i; c before *i*=k; c before *e*, *i*=tsh; d=z; g before *e*, *i*=j; gh=g hard; h=kh; j=zh; ș and ș=sh; sc, ș before *e*, *i*=sh; sch before *e*, *i*=sk; ț=ts.

SPANISH. The stress is penultimate in words ending in a vowel, or in *n* or *s* without written accent; in others it is final. Exceptions are marked by an acute accent. B=v formed with both lips; c before *e*, *i*=th, but in S. America=s; ch=tsh; cu before *a*=qu (kw), but before *e*, *i*, o=ku (often written cū or cū before a); d between vowels or final often=dh; g before *e*, *i*=Span. j; gu before *e*, *i*=g hard, but gū=gu; gu before *a*, *o*, *u*=gw, often almost w; h is silent except in combination with a consonant; j is a strong guttural h, almost kh; ll=ly, in S. America y; ñ=n̄; qu before *e*, *i*=k; x now=x, but formerly was often written where j is now used, e.g. Xerez=Jerez, pronounced herayth; in S. America x often=s; z=th, in S. America, s.

PORTUGUESE. The stress is on the penultimate if the word ends with a vowel, or in some cases on the antepenultimate; in words ending with a consonant it is final. A, e, o, u may be nasalised (see above); the nasal a is written am, an when final or before any other consonant than *m* or *n*, otherwise it is written ã; nasal e is written em, en; nasal o is ô; nasal u is um, un; ãe=Eng. long i nasalised; ão=ow nasalised; ôe=oi nasalised; e final is almost silent; o final=oo; ô=long o; ô=ô as in Eng. *not*; ou=o as in Eng. *no*; c before *e*, *i*=s; ch=sh; g before *e*, *i*=zh; gu before *e*, *i*=g hard; h is silent except in combination; j=zh; lh=Span. ll; nh=n̄; qu before *e*, *i*=k; s medial=z; s final or before voiceless consonants except s=sh; x=sh.

FRENCH. The stress is always on the last syllable, not counting final *e*, which is silent. The written accents do not denote stress, but the nature of the vowel. Vowels with the grave (*père*) and circumflex (*rôle*) accents are always long; those with the acute accent (*été*) always short. E in unstressed syllables has a dull sound almost like a short ô (Eng. *her*); é is like *e* in *fell*, but with the tongue arched; i, whether long or short, is formed with the tongue more arched than in Eng. *ee*, *i*; u=ü; y vowel=Fr. *i*; ai=ai (*fair*); ay has the same sound unless a vowel follows, when the sound of *y* consonant is interposed, e.g. *payer*, pai-yai. In proper names ay often=ah+y, e.g. *Bayeux*, bah-yô; au, eau=o long or short; ei, ey=Fr. *ai*; eu=ô long or short. œi=ô+ee; œu=ô; oi, oy=wa(h); ou=oo, but before a vowel=w; ui, uy strictly Fr. u+Fr. *i*, but approximately=wee. The diæresis on the second of two vowels indicates that they

are sounded separately, e.g. *Moïse*, *moh-eez*. Final e, es, and ue, ues are silent.

Nasalised vowels are those followed by m, n, either final, or before any consonant except m, n. In these syllables the m, n coalesces with the preceding vowel to form a single nasal sound. Nasalised e has two values, viz. en final (but not the preposition and adverb *en*), which is the short a of Eng. an nasalised, and en before a consonant other than n, which = the Fr. nasalised a. Nasalised i, ai, ei = Eng. short a (as in *an*) nasalised.

Final d, s, t, x, z, are generally silent unless the following word in the same clause begins with a vowel; final r is generally silent after e. C before e, i, y = s; ç = s; ch = sh; g before e, i, y = zh; gn = ñ; gu before e, i, y = g hard; h is silent except in combination; j = zh; ll often but not always = ly; qu = k; s between vowels = z; th = t; ti in the endings -tion, -tiel, -tien, etc. = Fr. si; w = v; x = ks or gz, but between vowels = s, z.

GERMAN. The stress is generally on the root syllable, and in compounds on that of the first element, if that is a word in itself. Generally speaking, the accentuation resembles that of English. Ae, â = ai (*fair*); ai = î (*fine*); au = ow; âu = oi; e final nearly = short ô; ei = î (*fine*); eu = oi; ie medial = ee; oe, ô = ô; ue, ü = ü; y vowel = Ger. i, sometimes ü; b final or before a cons. ending the same syllable = p; c before ae, â, e, i = ts; ch = kh; chs = ks; d final = t; g initial = g hard; g between vowels = gh (fricative); g final = kh; h is silent between a vowel and a consonant, only indicating the length of the vowel; h is also silent when final after a vowel, and between vowels when the following vowel is unstressed; j = y; ng is always as in *sing*; qu = kv; s before a vowel = z; s before p, t = sh; sch = sh; th = t; v = f except between vowels; w = v, but is silent in some names ending in -ow; z = ts.

DUTCH and FLEMISH. The stress is as in German. Ae (modern Du. aa) = ah; unstressed e nearly = ô; eeuw = ay + Du. w; ei = long i (as in *fine*); eu = ô; ie before r = ee; ij = long i (*fine*); oe = oo; oo = oh; ou, ouw = ow; u, uu = ü; ui, uy nearly = oi or ah + ü; b, d as in German, but d between oe, ô, ui and a vowel = y; g initial = kh, otherwise nearly as in Ger.; j = y; s always = s; sch before vowels (except the obscure or dull e in unstressed syllables) = skh, otherwise sch = s; sj = sh; th = t; tj = tsh; w = w without rounding the lips.

DANISH and NORWEGIAN. The stress is as in German. aa = aw; æ is a close e nearly like Fr. é or Eng. e in *bell*; aj = long i; av before a consonant = ow; ej = long i; ø, ô = ô; ôj = oi; y = ü; c before e, i = s; ch = k; d, dd between vowels or final = dh; d is silent after l, n, in the same syllable, and before s; f at end of a syllable = v; g before â, e, i, ô, y = y; gi = y; hj = y; hv = v; j = y cons; k before e, i, j = tsh; qv = kv; sj, sk, skj = sh; th = t; z = z, ts, dz.

SWEDISH. The stress is as in Ger. Aa, â, = aw or o in *not*; æ, ae as in Dan.; o final and in some other cases = oo, u; y = ü; c before e, i, y = s; dj = y; dt = t; f final = v; g before â, e, i, ô, y, or after l, r at end of a syllable = y cons.; g before t = k; gj = y; hj = y; hv = v; j = y; k before â, e, i, ô, y in same syllable nearly = tsh; lj initial = y; qv = kv; sk initial before â, e, i, ô, y = sh; sj, skj, stj nearly = sh; tj = tsh; z = s.

CROATIAN and DALMATIAN. Ie, ê = ye; b, d as in Ger.; c, cz = ts; é nearly = ts; ê, cs = tsh; dj, ds, dz, gj = j; h = kh; j = y; ñ, nj = ñ; r is sometimes a vowel; š = sh; sz = s; v = f or v; ž = zh; but ž final = sh.

CZECH. The stress is on the first syllable. Written accents mark length. E = ye; ey = ay; ou = o + oo; ů = oo; y = ü; c = ts; ck = tsk; č = tsh; ch = kh; d as in Ger., but di, di = dyi, dyee; h final = kh; ň = ñ; ř = rzh; š = sh; ti, tí = tyi, tyee; ž = zh; ž final = sh.

POLISH. The stress is usually on the penultimate. Written accents mark length. ą, ę are nasal vowels; é = yay; ó, o are close vowels, approaching oo, u; y = ü. Consonants with the acute accent are palatalised, the sound being something like that produced by a closely following y. C = ts; ć = tsh; ch = kh or k; cz = tsh; d as in Ger.; dz = j; h = kh; j = y; l = ly; barred l nearly = w; ń = ñ; rz = rzh; sz = sh; v = f; w = v; ż = zh.

WELSH. The stress is generally on the penultimate. Ae = long i, as in *fine*; au = ah + ü; aw = ow; ei = long i as in *fine*; oe = oi; u = ü; ui = i; w as vowel = oo; y = u as in *but*. The other vowels have the Continental values. C = k; dd = dh (*then*); f = v; ff = f; ll = voiceless l, i.e. l without vibration of the vocal cords, the effect being something like khl or thl, the first consonant being sounded faintly.

IRISH. The stress is usually on the first syllable, but usage varies locally. Written accents mark length. Vowels have the Continental values, except that â, a = aw, o (in *not*); and that o has a close

sound, almost like u in *but*. Combinations of vowels are very numerous; ai, ea = short a; aoi = ee; eâ = ah; éa, eu = ay; ei = short e; eo = short u as in *but*; eó = yoh; eoi = oh + short i; io = ee; io, ui = short i; iai = ee + short i; iú = yoo. The consonants b, c, d, f, g, m, p, s, t are aspirated, i.e. turned into fricatives by a following h, representing a point over the letter in the Irish alphabet; thus bh = v; ch = kh; mh = v; ph = f. Bp = b; c = k; dl, dn = ll, nn; dt = d; f is bilabial; g is always hard; gc = g; ln = ll; mb = m; s before or after e, i = sh.

HUNGARIAN. The stress is on the first syllable. Written accents mark length. Á = ah; a nearly = o in *cot*; âj = long i as in *fine*; aj = oi; cs = tsh; cz = ts; g is always hard, but gy is a palatalised dental somewhat like dy; j = y; ly is the palatal ly, almost passing into y; ny = ñ; s, ss = sh; sz, ssz = s; ty is the voiceless palatal corresponding to the voiced gy (dy), and resembles ty; ts = tsh; tz = ts; y is never a vowel, but is used to modify the preceding consonant; zs = zh.

CLASSICAL NAMES. The pronunciation of ancient Greek and Latin hitherto current in England is admittedly conventional, words being pronounced much as if they were English, with the following exceptions: e is never silent; when final it is always long; y is always a vowel, and pronounced like Eng. i. The diphthongs are represented by the following sounds, which are not all diphthongs: ae = ee; au = aw; eu = (y)ew; oe = ee; Gr. ei = long i; Gr. ou (more often spelt u) = oo. In some words the two vowels form separate syllables, when the second is often marked with the diaeresis, e.g. *Phaëthon*. In other combinations of vowels both are distinct, length being never indicated by doubling, e.g. *Bootes* = bo-ôteez; *Boetia* = bee-ôsha. The termination -eus is (1) yewss (*Zeus, Orpheus*), (2) e-us (*Timotheus*), or (3) ee-us (*Peneus*). The termination -es in personal names is always eez. Ch = k; initial ps, pt = ps, pt, or s, t; so before e, i, y = s; initial x = z.

The accent is usually on the antepenultimate, or the first in words of two syllables. In words of three or more syllables it falls on the penultimate, when the vowel of that syllable is followed by two consonants, unless the second alone is a liquid.

See Introduction to the Study of Language, L. Bloomfield, 1914; Language-student's Manual, W. R. Patterson, 1917.

Proof. Term used in English law, and the systems derived from it. It indicates the means whereby a fact is brought to the knowledge of a court of law, so that this fact may be properly taken cognizance of by the court. As a rule the contents of a document are proved by producing the document itself. A copy ~~will~~ not be received in proof unless either (a) the original is proved to be lost or destroyed; or (b) the original is in the hands of the opposing party, who refuses to produce it after due notice. Exceptions to this rule are to be found in the cases of certain public documents, e.g. a marriage register need not be produced—a certified copy is enough. A thing seen or heard must be proved by someone who saw or heard it. See Evidence.

Proof. In engraving and etching, an early impression on paper, or prints, from the plate or stone or wood block. Trial proofs are those printed by the engraver for his own use, as a test of the work. Artists' proofs, which come next, are signed by the artist or the engraver or both. There are also proofs before letters, i.e. before the letters of the title or other inscription have been added. See Print.

Proof Correction. In printing, term for the work involved in reading and correcting or altering a proof or impression of printed matter before it is cast or otherwise made ready in a technical sense for the press or printing machine. Every printing office has a department for this work, which is done by men called printers' readers, assisted by copyholders or reading boys.

When the copy or MS. has been set up, an impression of the type is taken by means of a hand press. This impression is usually called a galley proof. While the copyholder reads the MS. aloud the reader, with the galley proof before him, corrects upon it the mistakes made by the compositor or linotype operator, by the use of such marks as those indicated in the accompanying illustration. Proofs or pulls of the corrected type are known as revises.

Every author who wishes to see his work accurately produced should make himself familiar with the practical side of proof correction, bearing in mind that while clean copy means a clean proof, clear and neat marking and the avoidance of over-running save labour and prevent vexation. By over-running is meant the re-handling of each line of type caused by the insertion or deletion of words filling less than a line until the end of a paragraph is

Proof Spirit. Alcohol defined, in English law, as having a specific gravity of 12 to 13 at 51° F. Such proof spirit must contain 49.24 p.c. by weight, or 57.06 by volume of absolute alcohol. The expressions over proof and under proof are used in connexion with mixtures of alcohol and water. Thirty under proof means that 100 volumes of alcohol and water contain 70 volumes of proof spirit, while 30 over proof means that 100 volumes of (mixed spirit) with the proper quantity of water will yield 130 volumes of proof spirit.

During the Great War spirits were forbidden to be sold unless reduced to 30 under proof, while up to 50 was allowed. See Alcohol; Whisky.

Propaganda. Name given to one of the great Roman congregations of cardinals charged with the administration of the various departments of the government of the Church. The *(Congregatio) da Propaganda Fide* has charge of all the missionary operations of the Church. It was founded by Pope Gregory XIII in the 16th century. The *(Propaganda) College* is an institution at Rome for training missionaries.

Proof Correction. Examples of the principal marks used in correcting proofs for the press. The paragraphs as corrected appear on this page. Where a new paragraph is to be made the letters N.P. are written in the margin. Underlining a word with three short dashes indicates that it is to be set in capitals; for small capitals, two short dashes are made; or the letters may be simply underlined and the contractions caps and s.c. inserted in the margin.

reached or, by adjustment of spaces, the compositor makes the lines even. See Printing; consult also Authors' and Printers' Dictionary, F. H. Collins, 4th ed. 1912; Rules for Compositors and Readers, H. Hart, 25th ed. 1921.

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Propaganda (Lat. *propagare*, to multiply by layers). Literally, things to be propagated. Until the Great War this word was used mainly to denote the dissemination of religious tenets. But with the war came an intensive use of means to influence, first neutral, and then enemy sentiment, and this was given the name of propaganda. For a while the Germans employed this weapon with more energy and enterprise than any of the nations opposed to them, but they failed in the imaginative quality needed for success in the art of persuasion. Their efforts failed by their over-emphasis.

During the earlier part of the war the British attempts to assure neutral nations of the justice and ultimate success of the Allied cause were marred by the same fault. Instead of putting themselves in the places of those whom they desired to convert, and ascertaining what kind of argument would

uf./
o/g
ts./
i/o

l.c./
l.c./

o/g
H
1/2
#/
=/
run on/
under proof dilution/

ital./
stet/
rom./

be most likely to convince, they adopted the cruder method of direct statement and appeal, distributing reprints of speeches and pamphlets written from the Allied point of view, which was not by any means that of the peoples addressed.

Little importance was attached to this branch of the British effort by the army commanders, who, for the most part, maintained that success in the field was the best, and indeed the only valuable form of propaganda. At the beginning of 1918, however, Lloyd George was prevailed on to develop this aspect of warfare. He asked Lord Northcliffe to undertake the organization of propaganda in enemy countries, while Lord Beaverbrook was put at the head of the existing department which made its appeal to the neutral states.

From Crewe House there soon began to issue a stream of skilfully directed "paper bullets," as the Germans called them, which had the effect of detaching from Austria the subject nationalities, and of spreading in the German ranks discouragement and desire for peace. Leaflets and trench newspapers, diagrams and news bulletins, were dropped from balloons and aeroplanes. These were soon communicated by soldiers on leave to the nation generally, and all the German leaders, political as well as military, attributed to the results of Crewe House propaganda a share in the unexpected break-up of Germany's resistance in the late autumn of 1918.

The finish of the war caused a fresh intensification of propaganda. Its efficacy in creating opinion had been proved; now everyone wished to use it for his own ends. American efforts, which contrary to expectation had failed during the war through wild and fantastic exaggeration, were aimed at capturing markets. All the national governments which hoped to secure advantages from the peace spread their pretensions broadcast. The term propaganda came into use also as a synonym for indirect advertisement on a large scale; that is the meaning which most people now attach to it. See Northcliffe, Viscount; consult also *Secrets of Crewe House*, Sir Campbell Stuart, 1920.

Hamilton Fyfe

Propagation (Lat. *propagare*, to set slips). Horticultural term for the art of increasing or reproducing stocks of plants. There are various methods of propagation, e.g. seeding, cuttings, budding, grafting, layering, etc., described under their respective headings.

Bulbs are propagated by seed, and also by bulbets, or offshoots, young bulbs attached to the side of the parent. Propagation of plants generally, on a large scale, for the public markets is now carried on by a process of rapid forcing, and the employment of bottom heat for the purpose. See Gardening; Market Gardening.

Propellant. Material used in fire-arms to impart motion to the projectile. Whilst a propellant is popularly regarded as an explosive, there is actually a marked difference between them, the object of the latter being to cause a disruptive effect, while a propellant is required to exert a high pressure of a fairly constant character over an appreciable interval of time. The essential difference between the deflagration of a propellant and the detonation of an explosive, is that in the former case decomposition begins on the outside of the grains, and proceeds through the mass by the consecutive combustion of parallel layers, whilst in the case of a detonation combustion is started in the whole mass at the same moment, owing to decomposition being set up in all the molecules through the agency of an explosive wave. It follows that with a propellant the speed of decomposition can be varied by altering the shape or physical form of the material.

Vieille, the French scientist, made exhaustive researches on this subject, which culminated in his invention of *poudre B* (*q.v.*). He came to the conclusion that to obtain regular results it was essential that the propellant be in the form of a colloid. With a propellant of this nature he was able to establish (1) that the grains of colloidal powders retain their original shape, but merely diminish in size, until completely consumed, and (2) that the rate of combustion varies directly as the pressure. All modern propellants have a nitrocellulose base, this compound being gelatinized by the use of a suitable solvent. Some contain nitroglycerine in addition to the nitrocellulose, but such powders have a greater effect in eroding the gun. See Ammunition; Collodion; Cotton; Cordite; Explosives; Gunpowder; Lyddite; *Poudre B*; Pyrocollodion; etc.

Propeller (Lat. *pro*, forward; *pellere*, to push). In aeronautics, strictly that type of airscrew which is attached to the rear of the body of any aircraft, and which propels the machine, as distinct from the tractor airscrew which is attached in front, and draws the body after it. Colloquially the

word is used for any type of airscrew. The marine propeller is generally known as a screw (*q.v.*). See Air Force, Royal.

Propertius, **SEXTUS** (c. 49-16 B.C.). Roman elegiac poet. He was born at Assisium (Assisi) and was educated and made his home in Rome, where he won the patronage of Maecenas and Augustus, and was a friend of Virgil and Ovid. Propertius belongs to the circle of poets like Keats, Byron, and Shelley, who matured early and died young, his Elegies revealing a rich vein of original genius and many passages of deep passion. The majority of the earlier poems deal with the relations of the poet with his mistress "Cynthia," whose real name was Hostia, but the subjects of the last book are chiefly drawn from Roman legend and history. There is a translation by Prof. Butler in the Loeb Classical Library, 1912. See Catullus, Tibullus, and Propertius, J. Davies, 1876.

Property (Lat. *proprius*, one's own). In law, the same as ownership. It does not mean, as it does in popular language, the thing owned. Indeed many people may have property in the same thing. Thus a person to whom an article is let on hire has a limited property in it, though the absolute ownership remains in the person who lets it. Property, or ownership, is, in law, a bundle of rights, indefinite, but not unlimited in extent; and, except in cases of limited ownership, of unlimited duration. They include the right of disposal in all its forms. The Law of Property Act (*q.v.*), 1922, made changes

Prophecy (Gr. *prophēteia*). Term generally used in English to denote "prediction", or the power to foretell the future. This interpretation, however, lays stress upon what was only an insignificant part of the work of the prophet. There are two words for prophet in Hebrew—*nābi* and *roth*—and neither of them implies the power of prediction; the former meaning "he who announces," and the latter "the seer." In classical Greek, too, the term "prophet" signifies "the interpreter" rather than "the foreteller." Originally, therefore, prophecy signified the act of interpreting the will of God to men—and that was the supreme function of the prophets of the O.T.

"It is of the very essence of prophecy," says Canon Driver, "to address itself to the needs of the prophet's own age; it was the prophet's office to preach to his own contemporaries, to announce to them the judgements or the consolations which arose out of the circumstances of his own time." It is

an entirely false conception of prophecy to regard it, as Bishop Butler does, as "nothing but the history of events before they come to pass." There are elements of prediction in all prophecy, but they do not constitute its essence, and in not a few cases the predictions were not fulfilled. The essence of prophecy lies in its moral and religious teaching, or, in other words, in its revelation of the purpose and will of God. *See* Inspiration.

Prophylaxis (Gr. *prophylax*, advanced guard). Term applied to measures taken for preventing a disease. *See* Public Health.

Propionic Acid or **METHYL ACETIC ACID**. Acid produced during the fermentation of calcium tartrate, calcium malate, and glycerin, and also in the destructive distillation of wood. It is a colourless acid, resembling both acetic acid and butyric acid. Salts made from it have a fatty feel.

Proportion (Lat. *pro*, in comparison with, *portio*, share, or part). Literally, the relation of one thing to another, or a symmetrical arrangement. It enters, therefore, largely into architecture, in which the proportion of one part to another is a prime consideration. *See* Architecture.

Proportion. In mathematics, an equality of ratios. As an example the ratio 6 to 4 equals that of 24 to 16, and the statement as 6 is to 4, so is 24 to 16, is a statement of proportion. In general the proportion between four quantities, a, b, c, d , is written $a : b :: c : d$, a symbolism invented by the English mathematician William Oughtred (1575-1660). The theorem arising from the proportion is that the multiple of the first and last terms, ad , is equal to that of the intermediate terms, bc . If one quantity varies inversely as another, the two are said to be inversely proportional.

Proportion. Term given in medieval music to the admixture of different rhythms, according to mood, prolation, and time, the result being an enormous complexity, in which many 15th and 16th century composers appeared to take an excessive delight for its own sake. The chief proportions still exist in modern notation. *See* Mood; Music; Prolation; Time.

Proportional Representation. Term used for a method of electing representatives that aims at reproducing in the elected body the opinions of the electorate in their true proportions. It is worked best in constituencies each returning a number of members, and cannot be worked in one that returns only one. Special arrange-

ments must therefore be made for a bye-election caused by the death or retirement of a single member.

The base of the system is the transferable vote, introduced by Thomas Hare. The voter records his preference on the ballot paper and also marks a second name if he so desires. It is thus quite distinct from the second ballot. When the counting takes place, a quota of votes is fixed which a candidate must obtain to secure election. This is done by dividing the number of votes by one more than the number of members to be elected. Thus, if there are 40,000 voters, 7 members to be elected and 20 candidates, the quota is 5,000. On the first count, taking this as an example, if any candidates have received 5,000 votes they are declared elected. Most probably only one or two will succeed in securing election on the first count.

To fill the list, therefore, a second process takes place. The papers of the successful candidates are examined for next preferences, and are sorted among the unelected candidates accordingly. The surplus votes are then distributed in proportion to the numbers of next preferences. For instance, a candidate has received 7,000 votes, i.e. a surplus of 2,000; the elected candidate can spare two-sevenths of all his papers, and each unelected candidate obtains therefore as his share of the surplus two-sevenths of the papers on which he is shown as next choice. This leaves 5,000 for the elected candidate and gives a fair distribution of the surplus. When all surpluses have been dealt with, the candidate at the bottom of the poll is declared defeated and his votes are all transferred to the next preferences shown upon them. The latter process is continued until only the required number of candidates are left.

Since 1859, when Hare wrote on proportional representation, the method has been adopted to a fairly considerable extent. In the United Kingdom the Representation of the People Act of 1918, as first introduced, suggested it for large urban constituencies, but this the House of Commons refused to accept. It was retained only for certain university constituencies. In Ireland an Act of 1919 set it up for all local elections in that country, and it was provided for both in the Government of Ireland Act of 1914, and the one of 1920.

In Tasmania proportional representation was introduced in 1896, and it is also used to some extent in New South Wales and New Zealand. In South Africa the

Act of 1909 provided for its use in electing senators for the Union parliament, and it is employed by some municipalities in Canada. Of foreign countries Belgium, Bulgaria, Denmark, Holland, Norway, Finland, and Sweden have adopted proportional representation in varying degrees of completeness, while in the changes that followed the Great War it found favour in Germany, Poland, Czecho-Slovakia, and Italy. In the Church of England, under the Act of 1919, members of the Houses of Laity and Clergy are elected by this method. Proportional representation societies exist, one being at 82, Victoria St., London, S.W. 1. *See* Representation; Scrutin; Second Ballot; Vote; consult also *Treatise on the Election of Representatives*, T. Hare, 1859; *Consideration on Representative Government*, J. S. Mill, 1860; *Proportional Representation*, J. H. Humphreys, 1911; *The Reform of Political Representation*, J. F. Williams, 1918.

Propyl Alcohol or **ETHYL CARBINOL**. One of the products of the fermentation of sugar. It is also found in the latter portions of the distillate obtained in rectifying crude spirits of wine, i.e. in fusel oil. Iso-propyl alcohol or dimethyl carbinol is made from propylene and sulphuric acid. Both substances have the same chemical formula, C_3H_7OH , the former boiling at 97.4° C. and the latter at 82.7° C.

Propylite. In geology, a variety of andesite. The latter, a lava, when cooling, has been altered and decomposed by the hot solutions of metals or metallic substances, and is said to have suffered from propylitisation. The original minerals of andesite are replaced by others, owing to the action of the metalliferous solutions. *See* Andesite.

Pro Rata. Latin term meaning in proportion.

Prorogation (Fr., from Lat. *prorogare*, to ask publicly, to defer). In parliamentary procedure, the interruption of a sitting of both Houses by royal authority, usually at the close of the session. It is a formal process by which Parliament stands prorogued until a certain day, when, unless further prorogued, Parliament meets. After prorogation all bills automatically expire, and must be introduced *de novo* in the following session. For this reason Parliament has occasionally been prorogued for a single day in order to enable a bill to be introduced a second time, since no second bill of the same substance as a previous one may be introduced in the same session. *See* Parliament.

Prose (Lat. *prorsus*, straight-forward). Direct language composed as the vehicle of thought intended to be spoken. It is thus one of the two principal forms into which literature (*q.v.*) is divided, the other being verse, language composed as an expression of thought primarily intended to be sung or chanted to musical accompaniment. Its complete emancipation from the laws of metre that are the subject matter of prosody thus furnishes the capital distinction between prose and verse. Rhythm (*q.v.*) is an integral part of good prose, but if it is to fulfil its primary function the first three essentials of prose are directness, lucidity, and appropriateness of the language it employs.

Prose as a studied literary form is preceded by poetry in the history of every literature. Another general truth is that classic Greece set a standard of excellence in every sub-division of prose as of poetry, upon which no later civilization has improved. Herodotus with the confident swing of his narrative, Thucydides with his chiselled periods polished to the nail, and Xenophon with his almost indolent facility, remain the types upon which all later historians have modelled their style. No detail of technique has been added to the art of oratory since the voice of Demosthenes was stilled. Plato remains the perfect master of prose applied to the expression of human thought in its widest range.

Of the few great Roman names that need be recalled here, Cicero stands out as the most versatile master of Latin prose, excelling as orator, as essayist, and as letter writer. Caesar's commentaries on the war in Gaul give hardly sufficient evidence of the qualities that must have informed works lost to us to justify the very high encomiums lavished on them by his contemporaries, but it is indisputably the work of a great writer, if not indisputably a great work. Sallust owed much to Thucydides; Livy introduced an intricate embroidery into the pattern of the language, which has a fascination that was not lost upon Macaulay eighteen hundred years later. Tacitus, whose style sometimes perilously approximates mannerism, closes the era of classic Latin prose.

Of the prose literature of the modern world much is said in the articles scattered throughout this Encyclopedia. Perhaps the most original, in the sense of not being derived from classic sources, is that of Iceland, where a purely native form of prose heroic narrative was developed in the 12th

century. Even earlier than that England had a prose literature of her own, but this was based on Latin models, and it was not until the 16th century that the wonderful flower of English literature appeared in full perfection in the authorised translation of the Bible, especially the O.T. Thereafter the story must be followed elsewhere, through Donne, Cowley, Taylor, Temple, and Dryden, and through the romantic revival to the present day. In Germany, too, the Reformation brought in Luther's Bible the beginning of a vernacular prose literature. Elsewhere, in France and Italy and Spain, the story may be said to begin with the Renaissance; it is packed with great names, a few immortal. In all European countries the inheritance is rich. There is no indication, however, that, in any, trustees will fail to be forthcoming to preserve that which has been bequeathed, or lovers of literature to strive to increase the rich store for posterity.

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Proselyte (Gr. *pros*, to; *elthein*, to come). Term applied to a convert from one religion, opinion, or party to another. Originally it meant a Gentile convert to Jewish law and belief. Proselytes to Judaism were distinguished as proselytes of righteousness and proselytes of the gate. The first received circumcision and baptism; the second, also called sojourners, undertook to observe the precepts against idolatry, blasphemy, bloodshed, uncleanness, and the eating of flesh with its blood. Unless a proselyte was the son of a Jewess he could hold no public office nor become a member of the Sanhedrin.

Proskurov. Town of S.W. Russia. It is in the government of Podolia, and is a station on the Odessa-Volochitsk rly. 55 m. N.E. of Kamenetz-Podolsk. In the district are remains of an old wall, called the Wall of Trajan, coins of whom have been found. Grain, fruit, and tobacco are cultivated in the neighbourhood. Pop. 41,000.

Prosody (Gr. *prosodia*, relating to song). That part of grammar which treats of quantity, accent, and the laws of versification. See Poetry; Verse.

Prosopopoeia (Gr. *prosopon*, person; *poiein*, to make). In rhetoric, a figure by which inanimate things or abstract conceptions are represented as animate beings with human attributes. Such personification is common in the poetry of all peoples. Another

kind of prosopopoeia attributes probable but fictitious speech and action to historical persons.

Prospecting. The search for minerals conducted by trained workers. Although many valuable mineral deposits have been found by chance, others are discovered by systematic search conducted by miners or prospectors, qualified by a general knowledge of geology and mineralogy.

Having decided upon a locality, the prospector generally pays attention first to the streams, as these afford a geological section of the country, and also probably contain fragments of ore, derived from lodes existing in the watershed. The next step is to prospect the banks and hill sides adjacent to the stream, an operation called "loaming" in Australia.

The surface indications of a lode depend upon the tendencies of the lode material and the country rock to weather; if the former is the more resistant, the lode will project above the surface, and conversely, if the country rock is more resistant, the course of the lode will be denoted by a depression. The colour of the ground is important, as certain minerals produce characteristic stains, e.g. copper imparts green, blue, or red colours to the rocks, nickel shows green, iron, reddish or brown, and manganese black. Oil floating on the surface of water may lead to the discovery of petroleum, and brine springs indicate salt deposits. Mineralised soil sometimes causes a change of colour in the leaves of trees, and some plants only grow where they can obtain mineral substances necessary for their existence.

Geological and other reasoning often points to the existence of an ore deposit which is overlain by other strata. Diamond and churn drills are frequently employed for prospecting deep-seated deposits; the former are particularly useful in boring horizontal or inclined holes from the workings of a mine to search for other lodes, and the latter is often used to bore for coal, oil, iron ore, etc. The magnetic needle is used for prospecting for iron ore. See Mining.

Prospectus. Document issued by a new company or by one requiring further capital, setting forth for intending investors the prospects of the undertaking. A copy must be sent to the registrar of joint-stock companies, and the directors, who must sign this, are responsible for any false statements therein. A prospectus must give certain specified information about the directors of the proposed company and their interests in it,

about the property to be acquired, the amount of subscriptions on which the directors will proceed to allotment, etc. These and other conditions are laid down in the Companies Act, 1900, which strengthened the earlier Acts in certain necessary directions. The law is now contained in the Companies Consolidation Act of 1908.

Prospero. Character in Shakespeare's play *The Tempest*. The victim of a plot by his brother Antonio, the usurping duke of Milan, and Alonso, king of Naples, he spends 12 years in exile on an island with his daughter Miranda. Raising a mimic storm, he lands his enemies on the island, and with them Alonso's son, Ferdinand, who, falling in love with Miranda, paves the way for a general reconciliation.

Prostate Gland. Organ which surrounds the neck of the bladder and first part of the urethra in the male. Somewhat resembling in shape a Spanish chestnut, it is about one and a half inches across and contains a secretion which forms a constituent of the spermatic fluid. Prostatitis, acute inflammation of the prostate, is usually a result of gonorrhoea. Chronic prostatitis may follow.

Prostejov or PROSSNITZ. Town of the republic of Czecho-Slovakia, in the Moravian division. It is 13 m. S.W. of Olomouc (Olmütz), and has manufactures of textiles, beer, spirits, and farm implements. Pop. 34,000.

Prostitution (Lat. *pro*, before; *stature*, to place). Promiscuous sexual intercourse for the sake of gain. The women who practise it, usually for a livelihood, are known as prostitutes. Prostitution has existed in every country and in every age, and all the efforts of Church and State to stamp it out have failed. In Greece and Rome it was recognized and regulated, and the same is true of the countries of Europe, including England, during the Middle Ages. To-day in the United Kingdom the law treats it as an offence against public order, but cases are extremely difficult to prove and it flourishes openly. In France and other countries prostitution is regulated with varying degrees of strictness, prostitutes being registered, examined, and confined to certain areas. See Prostitution.

Protagoras (490-415 B.C.). Greek philosopher and sophist. Born at Abdera in Thrace, he taught in Sicily and latterly at Athens, from which place he fled after conviction on a charge of atheism brought against him for opinions expressed in his treatise on theology. He was drowned at



Prospero, in his cell, invokes a fairy masque to celebrate the betrothal of Miranda and Ferdinand

From the painting by Jos. Wright

sea. He was the author of a treatise which began with the famous sentence, "Man is the measure of all things." By this he meant that truth was relative and not absolute, and that what each man holds to be true, that is true to him. The same principle also applied to morality, right and wrong being dependent on opinion. Protagoras was the first to study and write on Grammar. He is one of the chief

entire to much divided, in the different species. The flower parts are in fours, but the form, like that of the fruits, varies. There are nearly a thousand species. Some of the Australian species yield close-grained red or pink wood of considerable value to the cabinet-maker on account of its pretty markings. Representative genera are *Banksia*, *Persoonia*, *Grevillea*, *Hakea*, and *Protea*.

PROTECTION: IN POLITICS & INDUSTRY

Percy A. Hurd, M.P., formerly Secretary of the Tariff Commission

For the presentation of the opposite case see *Free Trade*. See *Tariff Reform*; also *Corn Laws*; *Dumping*; *Political Economy*; and biographies of Joseph Chamberlain, Peel, and others

Protection, in the economic sense, may be defined as the fostering of home manufactures and produce by imposing taxes on the importation of goods from abroad. Under the laws of Edward the Confessor, foreign merchants in England were to sell wholesale only, and were not to engage in any work which would compete with the industry of English citizens. But in Saxon and Norman times there was no manufacturing industry in England worthy the name, and it is not until the reign of Edward III that England's industrial progress really began. This progress Edward III did his best to foster by discouraging any importations that could compete with home industry. The famous statutes of 1337 bear witness to the protectionism of Edward III.

The protectionist idea thus formulated was consolidated under the Tudor dynasty. Henry VII not only entered into commercial treaties for the security of the Icelandic and Mediterranean trade, but legislated on behalf of the staple woollen industry by prohibiting the export of unfurled woollen cloth; on behalf of the other textile industries by continuing for twenty years the old

prohibitions against the importation of ribbons and silks, etc.; on behalf of home industry generally by re-enacting in perpetuity Edward IV's ordinance that aliens should expend moneys obtained by them from selling their produce in the purchase of English produce, and by reviving statutes against the exportation of bullion. The policy of fostering home industries was carried on by Elizabeth.

The value of the protective policy, of which the foundations had thus been laid, was put to the test during the 17th century. Holland was then at her zenith, but before the end of the century England's industrial position was superior to Holland's, and this superiority was brought about by adhering to the protective principle and developing its application. The country's commercial prosperity had made steady progress from the time of Elizabeth, and seemed to reach a climax in the 18th century, and then England was enabled to reap a rich reward from the outburst of scientific invention which marked that century.

The bounty system was largely resorted to for the encouragement of industry. In 1703 bounties were given to American colonists on the

interlocutors in Plato's *Dialogue* which bears his name. See *Sophists*; consult also Greek Thinkers, T. Gomperz, Eng. trans. L. Magnus, 1901-12.

Proteaceae. Natural order of trees and shrubs (a few perennial herbs). They are natives of the warm regions of the S. hemisphere. They have leathery leaves of varied form, from

export to England of pitch, tar, hemp, turpentine, and masts and spars, so that the Swedish monopoly in these commodities might be destroyed. Bounties were also given to shipbuilders to encourage the production of ships of good class. The silk industry was benefited by the remission of export duties, and received export bounties besides. Raw silk from the Colonies was admitted free, and in 1765 foreign silk manufactures were prohibited. Earnest efforts were made to foster the linen trade, both by granting bounties and by placing fresh duties on foreign linen manufactures, the proceeds whereof went into a fund for encouraging the home growth of hemp and flax. Efforts were likewise made on behalf of the old staple industry of the country—the woollen manufacture. With regard to agriculture, the system of granting bounties on the export of wheat when the price was below 48s. a quarter stimulated the growth of food in England, and so helped to secure an efficient home-supply during famine years.

Fiscal Legislation and Free Trade

The centuries of development of fiscal legislation were followed in time by a very complex tariff law. Additional duties were imposed, not by a recasting of the tariff, but by adding to existing subsidies and import duties. The work of calculating the actual amount of duty payable on any particular import, or the actual rebate allowable on any particular export, became a labour of portentous intricacy. Under Pitt's administration, therefore, in 1787, the system was overhauled and the tariff codified and simplified.

The reign of free trade followed. There were three distinct stages in the movement. The initial stage was inaugurated by Canning and Huskisson in 1822, and in the following years the duties on salt, leather, grain, rum, coal, wool, silk, glass, hemp, coffee, and wine were taken off and the general duties lowered, so that in 1833 the protective taxes ranged from only 8 p.c. to 30 p.c. on the most important articles. Export duties were also reduced, but in the case of numerous partly-manufactured articles remained at an average of 10 p.c. By 1837 this movement had come to a standstill, and in 1840 there was even a general rise of 5 p.c. in the duties. The reform of the tariff had then become a party question. The great industrial capitalists had gained ascendancy in Parliament and, in the interests of cheap pro-

duction, demanded the abolition of duties on raw materials so as to lower the cost of production, and on corn, so as to lower the cost of living and enable them to reduce wages, and also to obtain, in return for the free admission of continental corn, the free admission of English manufactures into continental countries.

Peel's Tariff Reforms

The next stage was the tariff reforms of Peel, in 1842 and 1845-46, which gave full weight to the interests of the large manufacturers. The measures of 1842 removed the duties entirely from 750 articles; reduced those on raw materials, where it did not altogether remove them, to a general level of five per cent., and made a systematic reduction to 12 p.c. of the duties on partly-manufactured articles. The corn duty was also reduced, and at the same time the duty on wholly-manufactured articles was reduced to a maximum of 20 p.c. except that on silk, which remained at from 25 to 40 p.c. Export duties were still imposed on coal and wool, and preferential duties in favour of the Colonies were retained, these having as a rule only to pay half duty, or even less, on their principal products. The tariff of 1845 made 430 articles duty-free, among these being the most important means of subsistence, raw materials and partly-manufactured articles. This was succeeded, a year later, by the repeal of the Corn Laws, and from 1849 onwards a registration duty of 1s. per quarter took the place of the old duties on corn.

The third stage in the transformation of the tariff was reached in 1853, when Gladstone made 123 articles duty-free and reduced the duty on 146. Raw materials and partly-manufactured articles were now admitted free of duty, and the duties on wholly-manufactured articles were not to be more than ten p.c. There were still preferential duties in favour of the Colonies, but by the tariff of 1860, which accompanied the Anglo-French commercial treaty, the Colonies were put on the same level as foreign countries.

Although free trade had been established, a section of the Tory party continued to agitate for protection for the industries of their country. With the greater interest in imperial affairs which marked the close of the 19th century came a demand for imperial preference, and the movement received a new impetus when Joseph Chamberlain, in 1903, launched a campaign in favour of tariff reform. This did not succeed in converting the peo-

ple, but it was not without effect in securing from the Dominions a certain preference for British goods.

The Great War revealed the fact that Great Britain had been solely dependent for various imports upon Germany, and some of these were essential ingredients in certain manufactures. A demand for their protection resulted in the passing of a measure, called the Safeguarding of Industries Act, which came into force in 1921. It placed a duty of a third of their value on some 6,000 articles. In 1923 Stanley Baldwin, the prime minister, believing that the problem of unemployment could only be solved by giving his government the weapon of protection of the home markets against foreign competition, appealed to the country in Dec. for a mandate for his tariff proposals. His majority of 73 was converted into a minority of 97, and his resignation in Jan., 1924, was followed by the advent to office of a labour government.

In the British Dominions and foreign countries protection is the rule. In Canada it was part of the national policy carried out by Sir J. A. Macdonald, and since his time, although there has been a demand for free trade, the changes have been mainly in the direction of raising the duties. The U.S.A. declared for protection when the constitution was drawn up in 1789. France and Germany and other foreign countries follow a policy of protection.

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Protection Order. In English law, an order granted by a magistrate to a wife who has been deserted by her husband. Its effect is to protect any property she has, or may acquire, against her husband and his creditors, or any person claiming under him; and, in fact, puts her in the same position as to her property as if she were not married. If the husband, or any creditor of his, or person claiming under him, seizes or continues to hold any property of the wife's after notice of such an order, he is liable not only to restore the property, but also to pay to the wife double the value thereof. When an order has been made, the husband or any creditor or person claiming under him may apply to the court that it shall be discharged, and may succeed on showing mistake, fraud, or any other good ground.



1. Beetle (*Lithinus nigrocristatus*) on lichen. 2. Stick Insect (*Acrophylla chronos*). 3. Caterpillar of Shark Moth (*Eucalimia artemisiae*). 4. Red-winged Grasshopper (*Oedipoda fasciata*). 5. Locust (*Cycloptera speculata*). 6. Orange-tip Butterfly (*Euchloe cardamines*). 7. Homopterous Insect (*Umbonia spinosa*). 8. Homopterous Insect (*Pyrops tenebrosus*). 9. Oak Lappet Moth (*Gastropacha quercifolia*). 10. Caterpillars

of Moth (*Hypsa monycha*) imitating fruit. 11. Homopterous Insect (*Flatoides dealbatus*) resembling lichen. 12. Moth (*Antomeris io*), owl-like appearance as protection. 13. Crimson Underwing Moth (*Catocala nupta*). 14. Leaf Butterfly (*Kallima inachis*). 15. Tree Frog (*Hyla arborea*). 16. Caterpillar of a Thorn Moth (*Ennomos tilia*) resembling a twig. 17. Ptarmigan and Weasel in summer, and, 18, in winter.

Drawn by J. F. Campbell

PROTECTIVE COLOURING IN ANIMAL, BIRD, AND INSECT LIFE

Protective Colouring. Biological term for natural colour schemes which enable animals liable to destruction by their enemies to escape observation when at rest, their colours harmonising with those of their natural surroundings. In consequence they merge into the environment and are invisible at a short distance. Several striking examples were known to the earlier naturalists and hunters, but they were regarded as exceptional. Among these were the striping of the tiger harmonising with the grasses of the jungle, the spotting of the leopards reproducing the shadows of leaves on sun-lighted ground, and the assimilative colouring of the upper parts of ground birds such as woodcock and partridge, which rendered them invisible to birds of prey hovering far above.

It is now known that, so far from these examples being exceptional, it is rather the rule for beasts, birds, reptiles, crustacea, insects, etc., whose mode of life requires it, to be protected in this manner. Where the animal is inedible or has some offensive quality, as in the case of the skunk (*q.v.*), the coloration is of a character to render the animal highly conspicuous. As one general example, animals that feed on open sandy plains, such as the lion, camel, antelope, kangaroo, sand-grouse, and the lizards and snakes of such regions are uniformly coloured of a sandy tint.

The generally accepted explanation is that these cryptic colours and patterns, originally due to the tendency to variation in all living things, have been reached through natural selection; the individuals who harmonise least with their environment being the most likely to fall a prey to their enemies without leaving descendants, whilst those that most nearly resembled their surroundings would probably transmit their advantage to another generation. In each succeeding generation the same agencies would be at work, so that ultimately a condition of things is arrived at when it becomes very difficult for the pursuer to find his quarry. It is not pretended that this protective coloration gives absolute immunity from attack to every individual; it does not, but it gives a chance to the most fit, and helps in the evolution of the aggressor. *See* Animal; Bird; Coloration; Warning Colours; and col. plate to this article; consult also *The Colours of Animals*, E. B. Poulton, 1890.

Protector. In England a title bestowed on those, usually royal princes or leading noblemen, who

acted as governors of the kingdom, when the king was a minor or otherwise incapacitated from ruling. Thus the dukes of Bedford and Gloucester were protectors during the minority of Henry VI, the duke of York was protector in 1455 during Henry's illness, and the duke of Somerset was protector during the minority of Edward VI. Such protectors were appointed by the privy council. Cromwell's title of lord protector of the Commonwealth was given him in 1653. *See* Cromwell; Regent.

Protectorate. Word used in two distinct senses: (1) the authority exercised by a protector or quasi-dictator, with particular reference in English history to the regimes of Oliver and Richard Cromwell; (2) more generally, the protectorship of the weak, especially of less advanced races by a stronger race, and, hence, the territory thus occupied. The term was in frequent use during the latter half of the 19th century, when large tracts of Africa and Asia came under European influence. In several cases a protectorate was followed by definite annexation. Since the Great War certain territories previously held by Germany have been assigned as protectorates to be exercised under mandate of the League of Nations. *See* Colony; Mandate.

Protein or **PROTEIN.** Complex organic compound containing carbon, hydrogen, oxygen, and nitrogen with a little sulphur. Proteins form an important part of all living organisms and are the essential nitrogenous constituents of food. They are classified into (1) simple proteins, (2) conjugated proteins, and (3) products of protein hydrolysis. These include the albumen of white of egg, the globulin, fibrin, and albumen of blood, the ossein of bone, the gelatin and collagen of connective tissue, the casein of milk, and the creatin of meat. There are 50 proteins known to occur naturally in plants and animals. These all differ from one another in physical and chemical properties. *See* Albumen; Gelatin; Haemoglobin.

Proterobase. In geology, name given to a variety of dolerite, in which hornblende largely replaces augite. The term hornblende diabase is sometimes used for this type of rock, which is a weathered form of dolerite (*q.v.*).

Protesilaus. In Greek mythology, first of the Greek leaders to be killed in the Trojan war. He was slain, either by Aeneas or Hector, as he leapt from the ship to the shore. For the story of his wife's devotion, *see* Laodamia.

Protestant Alliance. Society founded in 1849 "to maintain the defence, against all the encroachments of Popery, of the Scriptural doctrines of the Reformation and the principles of Civil and Religious liberty, as the best security under God for the temporal and spiritual welfare of the British Empire." Its methods are largely political and parliamentary. It issues a monthly organ, *The Protestant Alliance Magazine*, and its offices are 433, Strand, London, W.C.

Protestant Episcopal Church. Official and legal designation of the episcopal Church in America which is in communion with the see of Canterbury. Soon after the first colonisation of N. America from England, chaplains and other agents undertook the spiritual care of the colonists, and Anglican services were started about 1579. Clergy were from time to time sent out from England, and an organization into parishes gradually came into existence. There were no resident bishops.

In the 18th century urgent appeals were made to the bishops in England to consecrate a bishop for America. In 1783 Samuel Seabury, who had worked as a clergyman in New Brunswick and New Jersey, was chosen by the clergy of Connecticut to be their first bishop, and was sent to England for consecration. Political complications and supposed legal difficulties prevented the English bishops from acting; but on Nov. 14, 1784, Seabury was consecrated bishop at Longacre, Aberdeen, by Scottish bishops, with the knowledge and implicit consent of the archbishop of Canterbury. In 1787 the archbishop consecrated Samuel Provost of New York and William White of Pennsylvania, in Lambeth Palace chapel.

At the American General Convention of 1789 the American Episcopal Church was organized as an independent religious denomination. The four bishops united in consecrating Dr. Claggett of Maryland in 1792, and thus a college of American bishops was formed, deriving their succession from combined English and Scottish sources. The American church was soon organized in dioceses, and the Prayer Book of the Church of England underwent certain revisions for its use.

The American Church has 68 dioceses, with 20 domestic and three colonial and missionary jurisdictions. It maintains 11 foreign missionary districts. There are nearly 6,000 clergy and about 4,500,000 adherents, of whom about 1,030,000 are communicants.

PROTESTANTISM AND ITS PRINCIPLES

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The reader of this article is also referred to that on Christianity and to those on the various branches of Protestantism, e.g. Church of England; Nonconformity; Presbyterianism, etc. See also Church; Reformation; Roman Catholic Church; also Knox; Luther; and biographies of other reformers

The term Protestant had a definite historical origin. During the progress of the German Reformation a diet was held at Spires in 1526. At this diet the reforming party was in the ascendancy—the papal party being weak through the absence of the emperor Charles V and his open hostility both to France and to the pope—and it was agreed that each German state should be at liberty to settle its own form of religion. The result of this was to protect and establish the Lutheran Church in nearly all North Germany, where the princes favoured the reformed faith.

This settlement was never accepted by the Roman party or by the emperor; and the latter, as soon as he had concluded the French war and ceased to be in conflict with the pope, called a second diet at Spires in 1529. On this occasion the Roman party obtained a majority. The territorial arrangement, sanctioned by the former diet, was abolished, and instead enactments were made which continued the protection and endowment of the "old Church" in reformed Germany, while not tolerating Lutheranism in Roman Catholic states. Against these decrees the minority of the diet—princes and representatives of cities—lodged a protest. This was not against any of the doctrines of the Roman Church. It was not theological, but legal and ethical. Legally, it protested against a unanimous agreement of one diet being reversed by a majority of another. Ethically, it asserted the principle that, in matters of religion, a majority must not and cannot coerce the individual conscience. This is what, historically and originally, Protestantism is.

Protestantism and Roman Catholicism

The word came rapidly into more general use to describe the system separated from the Roman Church. In this use it had first a positive, and only later a merely negative meaning. When the Reformed Churches were described or described themselves as Protestant, that did not mean merely a denial of Roman errors, but the whole faith characteristic of and held by these Churches. It was in this sense that early Anglican divines used the term; and thus even Laud disclaims any practices

"to Popery or any way blemishing the true Protestant religion established in the Church of England."

Here the "true Protestant religion" is the full faith without either false Roman accretion or other diminution. In the same sense the word is used in the English coronation service, where the sovereign swears to maintain "the laws of God, the true profession of the Gospel and the Protestant Reformed Religion established by law." But a narrower and negative use of the term inevitably grew up as non-Roman Christianity in the West developed various sects and sections, some of which had little positive church teaching, and the common feature of which was not their affirmations but their agreement in denying Romanism. Thus Protestantism gradually lost its original positive and evangelical character and became little more than an equivalent for the denial of Roman Catholicism.

Opposing Doctrines

When we turn from the historical to the theological meaning of the term, it is important to note that beneath all the doctrinal antagonism, or divergence, which arose in the 16th century, there was still great fundamental agreement. The Reformers were careful to maintain their allegiance to the verities of the Catholic creeds, and on the Being of God and the Person of Christ Augsburg and Geneva did not depart from Nicaea. Where Protestantism differed from the Roman Church was on matters subordinate to these primary articles of Christian faith. Into the details of this divergence—the opposing doctrines on such matters as sacraments, the Church, justification, and so on—it is impossible here to enter. It may suffice to indicate the two root principles which are the source of the separation.

Protestants and Romanists differ as to what is the rule of faith—i.e. the standard or authority of Christian truth and practice. Both sides admit the authority of the Christian Scriptures; but to Protestants this is supreme and sufficient, while to Romanists it may be added to by ecclesiastical tradition, and it is always to be accepted as interpreted by the Church. The Roman Church, therefore, does not admit

an appeal to Scripture against authoritative Church doctrine or practice, whereas this is the appeal which is constantly made, or which is professedly made, by the Reformed Churches.

Here is the source of a number of the most conspicuous divergences between the two systems, in such matters, for example, as the number of the sacraments or the manner of their observance, and in many features of worship and of religious life. It should be added that the Protestant appeal to Scripture as the rule of faith does not—and in the early days of the Reformation did not—imply a rigid or literal view of biblical inspiration and verbal inerrancy; the appeal was rather to the word, or utterance, of God which is in the Bible rather than to the book. But Protestantism has often exaggerated the authority of the biblical, as Romanism has that of the ecclesiastical inspiration.

Justification and the Sacraments

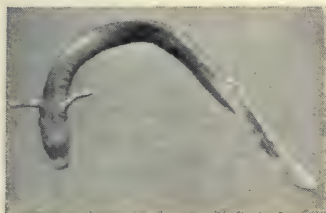
The other main source of divergence between the two systems goes deeper than any differences as to an external standard, and concerns the experience of religion. The Romanist system of religion is characteristically and essentially sacramental and sacerdotal. In it, the sacraments are the sole authorised means of saving grace, and they are authorised to be such only when administered by a validly qualified order of priests. Protestantism, however, took its rise out of a religious experience which did not depend on this. It found justification and all else that might be contained in salvation through the direct and personal relationship of the soul and Christ, unconditioned by the necessity of sacramental and sacerdotal means. This did not imply that Protestantism denied or dispensed with either the sacraments or the ministry; but it did deny that only through these is the Christian salvation given. Thus the Protestant—or as the Reformed Churches would call it, the evangelical—experience of justification by faith led to an entire revision of the view of the relation of the individual soul to God and His grace, and to what was called "the universal priesthood of believers," which means that God's grace or salvation are immediately through faith open and available, not mediating *per sacerdotem*.

This was really the deepest dividing line at the Reformation, and it had effects on the whole system of church doctrine and practice. It would be an exaggeration to say that here are two religions, but here are two irreconcilable ways of

working religion. This last remark may lead to the reflection that, deep as are the differences between the Protestant and the Roman systems, they are, after all, not differences as to the source of religion. The aggregate number of persons accepting generally the Reformed principles may be reckoned at between 160,000,000 and 180,000,000.

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Proteus (*Proteus anguinus*). Genus of amphibians, found only in subterranean waters in Dal-



Proteus. Blind amphibian of subterranean waters, showing the rudimentary limbs

W. S. Berridge, F.Z.S.

matia, Carinthia, and Carniola. It is eel-like in general appearance, 10 to 12 ins. in length, but has four very small and rudimentary limbs, and retains external red gills throughout its life. The skin is smooth and flesh-coloured, and the eyes are beneath the skin. When the proteus is kept in captivity and exposed to the light, the skin tends to turn black. The animal is totally blind, and is of very sluggish habits. *Pron.* Pro-teuss.

Proteus. In Greek mythology, a sea deity, son of Poseidon or of Oceanus. He had the power to foretell the future, but was always reluctant to exercise it. When consulted as to the future, he was in the habit of assuming different and sometimes terrifying shapes. Those who were bold enough to seize him and keep a hold throughout all his changes of form would eventually succeed in getting him to speak. Proteus was supposed to live in the island of Pharos, where he tended Poseidon's flocks of sea-monsters.

Proteus. One of the two gentlemen of Verona in Shakespeare's play of that name. His name typifies his changeableness, for when his friend is banished he woos that friend's love, Silvia, forgetting his own absent Julia, only to return to Julia on her reappearance.

Protevangelium Jacobi. Work ascribed to S. James, "the Lord's brother" and first bishop of Jeru-

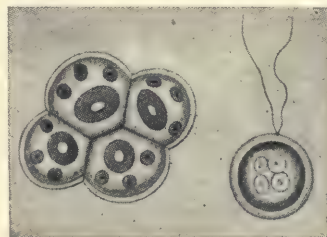
salem. Part of the N.T. Apocrypha, it contains 25 chapters, in which is given a legendary account of the birth of the Virgin and that of Christ. It shows traces of Ebionitic origin, and may have been based late in the 3rd century upon an earlier work. *See* Apocrypha; consult also Contributions to the Apocryphal Literature of the N.T., collected and edited from Syrian MSS. in the British Museum, W. Wright, 1865.

Prothero, Sir George Walter (1848-1922). British historian. B. Oct. 14, 1848, he was educated at Eton and King's College, Cambridge, and was for a time a master at Eton and a university extension lecturer. In 1876 he was made tutor and lecturer in history at King's College, London, a post he vacated in 1894 to become professor of modern history at Edinburgh. He remained there until 1899, when he succeeded his younger brother as editor of The Quarterly Review. Prothero's first historical work was The Life and Times of Simon de Montfort, 1877. He was one of the editors of The Cambridge Modern History, and for four years president of the Royal Historical Society. He was made a fellow of the British Academy, and in 1918 was appointed director of the historical section of the foreign office. Made K.B.E. in 1920, he died July 10, 1922. His brother was Lord Ernle (q.v.).



Sir G. W. Prothero, British historian
Russell

Protococcus pluvialis. Simple one-celled microscopic green plant of the natural order Protococci-



Protococcus pluvialis. Highly magnified specimen of complete plant, shown on left, and right, plant dividing into four swarm-spores

deae. It is common in fresh water and abundant in all standing rain-water. It is of spherical form, and of bright green tint with a spot of red—sometimes so greatly extended as to make the whole plant appear red. It multiplies by division of the cell-contents into four

or more swarm-spores, each furnished with two delicate long lashes by whose vibration they are propelled through the water. They exist as dried-up resting spores on tree-trunks and wooden fences, revivifying after rain. Red forms cause the phenomenon known as red-snow and blood-rain. It is also known as sphaerella.

Protocol (Gr. *protos*, first; *kolla*, glue). Originally, a fly-leaf glued on to MSS. to show the writer's name; hence, the original draft of a deed or other document. In diplomacy, the word signifies the rough draft of a transaction, or the original copy of a treaty, etc.; more particularly it means a diplomatic convention which does not require formal ratification. In Scotland, a protocol is a register in which notaries are required to enter copies of every document executed by them. *See* Diplomacy.

Protogenes. Greek painter of the 4th century B.C. Born at Caunus, in Caria, he worked at Rhodes, where he had a house just outside the city walls, and here he continued to paint tranquilly during the siege of the city by Demetrius Poliorcetes, 305-304 B.C. His indifference delayed the capture of Rhodes, since the assailants refrained from setting fire to this part of the defences, being reluctant to destroy the artist and his works. He painted a famous picture of a Satyr playing on a flageolet, into which he introduced a partridge so life-like that some living partridges were deceived. *Pron.* Pro-toj-eneez.

Protogine (Gr. *protos*, first; *gignesthai*, to become). In geology, name given to a granite of gneissic structure. It consists of quartz, felspar, and a greenish mica belonging to the sericite or the chlorite family. The name is specifically applied to rocks of this structure found in the Swiss Alps.

Protophyta. Division of plant life. The term was adopted by some authorities to include the lowest forms of Algae and Fungi, which are now more generally considered as Thallophyta (q.v.).

Protoplasm (Gr. *protos*, first; *plasma*, anything formed). Living substance constituting the cells of plants and animals. It is the physical basis of life, the essential and fundamental material of which all cells are composed, and in which the manifestations of all vital processes occur. Physically speaking, protoplasm is a soft, colourless, viscid, transparent or translucent substance composed of two parts.

There is a very delicate thread-like network, or reticulum, technically known as spongioplasm. In

among the meshes of this network is a clear semi-fluid substance termed the hyaloplasm, which possibly acts as a nutrient material for the network. The spongoplasm is contractile and elastic, and is often seen to be in very active movement. At the beginning of the 19th century various biologists observed that the cell contents of certain algae become extruded in jelly-like globules, which swim about independently in water for a time, ultimately coming to rest and growing into new algae.

About 1826 a detailed study of the alga *Vaucheria* led to the discovery that there are certain plants which during their development pass through this motile stage as little globules, and about the same time it was pointed out that most cells have an outer lining or cell wall with soft contents inside. To these contents was given the name of the primordial utricle, which ultimately was shown to be a gelatinous slimy substance living inside the cell wall. In 1846 the name of protoplasm was given to this substance of which cell contents are composed.

Protoplasm can exist without any special protective envelope, but it usually forms one for itself, so that in a complete cell the protoplasm should be regarded as the living substance in the cell, and the envelope which it has itself formed may be looked upon as the skin of the cell.

From a chemical point of view, protoplasm is an exceedingly complicated substance. As long as it is living, there is a constant series of chemical changes going on within it. According to some, protoplasm is composed of one very highly complex substance, which itself is built up of molecules which must have an almost unimaginable complexity. Others incline to the view that there are in protoplasm a number of simpler substances more or less dependent upon each other. Roughly speaking, the composition of protoplasm may be said to be somewhat allied to that of albumen, and the term protein is used to designate all substances of an albuminous nature.

Protoplasm in the interior of a growing cell exhibits many curious vital phenomena. As it fills up the cell, the central part may be observed to relax so as to form vacant spaces or vacuoles. Between these vacuoles the protoplasm may arrange itself into partitions, which again split up into threads, stretching across the cell cavity. At other times the growing protoplasm becomes motile, and these move-

ments can be observed with a good microscope in such large cells as have thin cell walls, particularly when the protoplasm itself contains a number of little dark granules, as it often does. These granules move backwards and forwards with the movements of the protoplasm, enabling the latter to be seen. Curiously enough, they never pass into the cavities of the vacuoles.

A living protoplast, i.e. a mass of protoplasm, is able to move its parts, expand, contract, divide, and fuse with another similar portion. It can even utilise different parts of itself for special functions. It can produce definite chemical compounds and excrete them when necessary. It can secrete its own cell wall, and it can also secrete in the spaces of the vacuoles within it a watery fluid, called cell sap, in which there may occur various substances such as sugar, acids, and similar matters.

Further, in the substance of the protoplasm itself a great variety of structures are produced in different sorts of cells, which can be definitely recognized under the microscope, such as the cell nucleus, granules of starch, and grains of chlorophyll. These chlorophyll elements are not essentially different from the protoplasm which forms them, and in which they remain during the whole of their existence, but their green colour renders them easily visible. Other substances which may be formed in the protoplasm include crystals such as those of oxalate of lime, and drops of fat, and all these various products, as well as the cell-wall itself, are the result of the vital processes inherent in protoplasm, and have some reference to the requirements and circumstances of the moment. See *Biology*; *Cell*; *Life*.

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Protopopoff, ALEXANDER (d. 1918). Russian statesman. Formerly in the army, he became provincial delegate of the Zemstvo and marshal of nobility in the Volga district. Elected to the Duma, he was at first a leader of the liberal party. As vice-president of the fourth duma,



Alex. Protopopoff,
Russian statesman

he headed the parliamentary delegation to Allied countries in the spring of 1916, and on returning to Russia was discovered to have entered into secret negotiations with the German minister at Stockholm for a separate peace. He became minister of the interior in Oct., 1916, and after the downfall of Stürmer was virtually dictator, and on the murder of the latter he became the most powerful of the pro-German plotters. To further his ends he entered upon a policy of provoking the disturbances in Petrograd which led directly to the Revolution. He was tried by the Bolsheviks in July, 1918, and shot in Moscow in September.

Protopterus annectens. Species of mud-fish. Found only in the rivers of tropical Africa, it resembles a bulky eel, and may attain a length of 6 ft. The swimming bladder is modified to serve the purpose of a lung, so that the animal is able to live for long periods out of water. When the streams dry up in the summer, the protopterus buries itself in the mud, where it forms a kind of cocoon, and remains dormant until the wet season. It seems to be nocturnal in habit, and creeps over the mud in shallow water by the aid of its limb-like fins. In the breeding season the male constructs a hole in the edge of a swamp, and when the eggs are deposited by the female, he watches over them till they hatch. By constantly waving his tail over them he causes currents in the water, and ensures their sufficient aeration. In the early stages, the young of the protopterus are very much like the tadpole of a newt.

Prototheria (Gr. *protos*, first; *therion*, wild beast). Lowest division of the zoological class mammalia. It includes only the ornithorhynchus and the two spiny ant-eaters, all of which are restricted to Australasia and New Guinea. These animals lay eggs and have only one external excretory aperture. See *Animal*; *Mammal*.

Protozoa (Gr. *protos*, first; *zōon*, living thing). Zoological term for the phylum of the animal kingdom, which includes the lowest forms of all. They consist of single cells, or of colonies of single cells, each of which is capable of separate existence and of reproducing its kind. They are distinguished from all other animals by the two features that in the majority of cases the body consists of a single cell of protoplasm which cannot be differentiated into tissues, and that they reproduce by the whole animal breaking up into germ cells. In all the higher animals the organism

consists of a series of cells, arranged in at least two layers, and specialised for the performance of various physiological functions.

The protozoa may be described as aspects of jelly, the largest of them being only just visible to the naked eye. A good example is seen in the amoeba (*q.v.*) found in the mud of stagnant ponds. Many of the protozoa, as the Foraminifera and the Globigerina, secrete external chalky or flinty skeletons or shells, which form the ooze of the ocean depths and the vast deposits of chalk in hills. Being unicellular or more correctly non-cellular, a protozoon has no organs. The entire body protoplasm is concerned in the assimilation of food and the performance of all the necessary functions of life.

The protozoa may be divided into four classes. The Rhizopoda are the lowest, and include such animals as the Amoeba, the Foraminifera, and, according to some authorities, the Mycetozoa. The Flagellata possess whip-like processes, and are often known as Infusorians. The Ciliata are more or less edged with cilia, by means of which they swim and catch food, as the Paramoecium and Vorticella. The Sporozoa reproduce their kind by the production of spores, the contents of which break up into amoeboid young. In their early stages, these are parasitic within the bodies of higher animals, and some give rise to serious diseases, as malaria and yellow fever. See Amoeba; Animal; Infusoria; Metazoa; Paramoecium; Rhizopoda; Sporozoa; Volvox; consult also Protozoa, M. Hartog, vol. I, Cambridge Natural History, 1906; An Introduction to the Study of Protozoa, E. A. Minchin, 1912.

Protractor (Lat. *pro*, before; *trahere*, to draw). Instrument for measuring and laying down angles. The simple protractor consists of a quadrant or semicircle of wood, metal, or some transparent material graduated along the arcual edge into degrees. Straight-edge protractors are also used, the graduation lines appearing drawn obliquely from the centre of one edge to points on the other edge. In marine surveying a three-arm protractor is used, the middle arm being fixed at the zero of a circular scale, the other two movable for measuring angles each side of the middle arm. See Surveying.

Proud Flesh. Overgrowth of new tissue during an unhealthy condition of wounds or ulcers. The newly formed cells are pale in colour and are weakly; they require treatment with dry dressings or rubbing with blue stone.

Proudhon, PIERRE JOSEPH (1809-65). French political philosopher. Born at Besançon, July 15, 1809, he worked as a printer until 1837, when he published his *Essai de Grammaire Générale*, a philosophical study. In 1840 appeared his



P. J. Proudhon

Qu'est ce que la Propriété? — a strong attack on the principle of property, which he declared to be theft. Subsequent works

were his *Avertissement aux Propriétaires*, 1842; *Création de l'Ordre dans l'Humanité*, 1843; and *Contradictions Économiques*, 1846. In 1848 he was elected to the Assembly, edited the *Représentant du Peuple*, and was imprisoned, 1850. Prosecuted after publishing *De la Justice dans la Révolution et dans l'Église*, 1858, he lived in Belgium, 1858-63. A man of high personal character, he died at Passy, Jan. 19, 1865. Proudhon is important in socialist thought as a forerunner of Marx. He urged the ideal of service balancing service in society, and that the ultimate end of government was anarchy, i.e. that in the ideal society government would be unnecessary. His ideas were partly crystallised in the suggestion he put forward for a bank of exchange. The main principle of this was the issue of bank notes against produce handed into the bank. A bank on these lines, however, failed. His collected works were issued, 1867-70, and his correspondence, 1875. See *Life*, C. A. Sainte-Beuve, 3rd. ed. 1873.

Proust, JOSEPH LOUIS (1754-1826). French chemist. Born at Angers, Sept. 26, 1754, and educated as an apothecary, he became chief pharmacist at the Sal pêtrière, Paris. Afterwards he went to Spain, where ultimately he became director of the royal laboratory at Madrid, but was ruined by the Spanish war, the French on taking Madrid destroying his laboratory and collections. He returned to France, 1806, later receiving a pension from Louis XVIII, was elected to the academy



Joseph Proust,
French chemist

of science, 1816, and died at Angers, July 5, 1826. Proust discovered grape sugar, 1805, in various natural products, and was the first to prove that the elements combine in a small number of fixed proportions, Dalton afterwards establishing the law of multiple proportions.

Proustite. In mineralogy, a sulpharsenite of silver. A bright red colour by transmitted light, giving it the alternative name of ruby silver ore, it is found in Saxony, Spain, and other parts of Europe, and in many of the silver mines of N. and S. America. The mineral is named after Joseph Louis Proust.

Prout, JOHN (1810-94). British agriculturist. Born Oct. 1, 1810, he emigrated to Canada and farmed in Ontario, 1832-42. Returning to London in 1842, he settled in Sawbridgeworth in 1861, and established on scientific lines a farm, where he made valuable experiments in cereal raising on clay soils, publishing the results of his observations in *Profitable Clay Farming*, 1881. He died Dec. 7, 1894.

Prout, FATHER. Pseudonym of the Irish humorist, Francis Sylvester Mahony (*q.v.*).

Prout, SAMUEL (1783-1852). British painter. Born at Plymouth, Sept. 17, 1783, he studied under John Britton,



settled in London in 1812, and in 1820 was elected a member of the Water Colour Society. His earlier works were landscapes and coast scenes, but visits to the European continent in 1818 and 1824 stimulated the talent for picturesque architectural subjects by which he acquired his reputation. He died at Camberwell, Feb. 10, 1852.

Prout, WILLIAM (1785-1850). British chemist and physician. Born Jan. 15, 1785, at Horton, Gloucestershire, and educated at Edinburgh, where he took the degree of M.D., he turned his attention to chemistry. In 1815 he published his paper on atomic weights, in which he first announced that the atomic weights of all elements are exact multiples of that of hydrogen. He made a special study of the substances found in living organisms, and was the first to obtain urea in a pure form, and in 1823 to discover the existence of free hydrochloric acid in the stomach. Prout wrote many scientific papers, and died April 9, 1850.

Provence. Province, one of those into which France was divided before the Revolution. It was a province of the Roman Empire, before the opening of the Christian era, and lay between the Rhône, the Alps, and the Mediterranean. Its capital was at first Aix, and then Arles, with Marseilles as another important city. Its boundaries were continually changing, and its close association with Burgundy has led to much confusion between the two. After the fall of the Roman Empire, the S. part of Provence was seized by the Visigoths, and in the 6th century the whole of it appears to have come under the rule of the Franks.

History after Charlemagne

It was transferred, either in whole or in part, from one king to another during the century which followed the death of Charlemagne, but before 900 it had been again united and formed into a kingdom for a certain Boso, brother-in-law of Charles the Bald. This was called the kingdom of Provence, or Burgundy, but it must not be confused with the other kingdom of Burgundy, away to the N. It had but a brief existence, and Provence was next included in the more N. Burgundy, which, in 1032, passed by bequest to the German king, Conrad II.

Before this time, as all over the Carolingian Empire, a number of counts had arisen in the district, one of whom soon made himself paramount. He was called the count, duke, or marquess of Arles, or sometimes of Provence. Early in the 12th century the heiress of this family, the real although not the nominal sovereign of Provence, married the count of Barcelona, to whose heir, Alphonso, king of Aragon, it passed about 60 years later. He and his son ruled it for some years, and then it went, again by marriage, to Charles of Anjou, king of Naples, who had trouble with the Provençal towns, then becoming rich and turbulent.

During the next two centuries, i.e. the period between 1250 and 1470, the country of Provence was disturbed and impoverished by warfare between its Angevin rulers and their many foes. In 1482 the last count bequeathed Provence to Louis XI of France, whose successor Charles VIII made good his authority therein against other claimants. Provence, whose overlord had been the German king, thus passed definitely to France. It retained certain special privileges, including an assembly of estates which endured until the 17th century, and it was never quite merged in the rest of France as

were other provinces. Provence now constitutes the departments of Bouches du Rhône, Var, Vaucluse, and Basses-Alpes. It is noted for its valuable Roman remains.

LANGUAGE AND LITERATURE. Provençal proper was originally the most important dialect of the broader Romance language known as the *langue d'oc*, which in the 12-14th centuries was the spoken tongue of S. France, Italy, and Spain. A highly developed literary language by the 12th century, its hold was weakened by the political developments of France and Provence and by contact with the *langue d'oïl*, and by the mid-14th century it was little more than a patois. Derived directly from Latin, Provençal bears a close general resemblance to the French language, but has important phonetic differences. With many local variations and French modifications, the dialect survives in S. France.

Provençal literature was rich both in quantity and in variety of form. The chivalrous romances of Provence, such as Flor et Blancheflor or Gérard de Roussillon, were overshadowed by those of the north, but in the lyric poetry of the troubadours it was unrivalled in its time. Among the principal forms were the *canzones* and *albas*, love songs, the *serventes*, satiric songs, the *plants*, plaints, *prèzies*, war songs, *tensons*, dialogues, and *pastorelas*, shepherd songs. Prose works are few and of minor interest. The development of this great literature reached its climax during the 12th century and ended practically with the 13th.

The 19th Century Revival

A notable revival, however, in Provençal literature took place in the 19th century. Chiefly under the impulse of Joseph Roumanille and F. Mistral, the Félibrige was founded in 1854, with the object of preserving the vitality and purity of the language. Among other notable poets associated with the revival have been Jacques Jasmin, Théodore Aubanel, Jean Brunet, Paul Giéra, Xavier de Ricard, Félix Gras, and Pierre Devoluy. The annual publication *Armana Prouvençau*, founded in 1854, reflects the main current of the movement and has reached a wide circulation in the Midi, and several Provençal periodicals appear in the principal towns. See France; Troubadour; consult also *Histoire de Provence*, 4 vols., A. Fabre, 1833; *Old Provence*, T. A. Cook, 1905; *Provence and Languedoc*, C. Headlam, 1912.

Proverb (Lat. *pro*; *verbum*, word). Short familiar sentence, an obvious truth or moral lesson. De-

scribed as the collective wisdom of mankind, or, by Cervantes, as "short sentences drawn from long experience," they are the most intimate folk-lore, for they embody, in simplest, pithiest terms, the homely knowledge of the common people, their everyday philosophy learned from experience of the ways of men and women and universal nature. Any clever man may make an aphorism, but no aphorism becomes a proverb, in the accepted sense of the word, until it has been tried by time, and obtained currency by general consent.

It is impossible to name the author of any proverb. Some obscure sage must first have formulated each one of them in words, but they seem rather to have emanated from the common consciousness and crystallised into phrases, much as seeds scattered by the wind put forth branch and leaf and open into flower before any man is aware of them. Certainly, the majority of proverbs were familiar in the mouths of the multitude long before they were written down. Many have found niches in the ancient literatures of Greece and Rome, of China, India, and Arabia. Each country, often each part of each country, has its own characteristic sayings, Spain, perhaps owing to Moorish influence, being very rich in them, but human nature and experience being essentially at one the world over, there is a marked affinity between them.

Frequently the same proverb, with colloquial variations, belongs to so many nations that none would venture to say in which country it was originally born, or whether it was spontaneously generated in all. "There's many a slip 'twixt the cup and the lip" is an old English proverb; but the French have one as old: "The soup is often lost between the hand and the mouth"; and in the 2nd century A.D. Gellius quoted "Many things happen betwixt the cup and the lip" as a Greek proverb matching a world-old Latin one. "It is too late to shut the door when the horse is stolen" has equivalents in France, Holland, Denmark, Italy, India, and Japan. Sterne is credited with "God tempers the wind to the shorn lamb," but a century earlier George Herbert included in his *Jacula Prudentium* "To a close-shorn sheep God gives wind to measure," and his was a collection of such wise saws, English and foreign, as were already popular.

Before Herbert, John Heywood, in 1546, compiled a book of English proverbs, and Ray followed his example in 1670. In 1855 a Hand-

book of Proverbs was added to Bohn's Library, and there has been a later collection by W. C. Hazlitt. The Scots have shown pious care in the preservation of their own proverbs. Since David Ferguson's in 1641, there have been four collections, in addition to one of Gaelic proverbs, by Macintosh, 1785, and another by Alexander Nicholson, 1882. Good French and Italian collections are *Livre des Proverbes Français*, 1859, and *Proverbi Veneti*, 1882. Spain, which is rich in proverbial lore, is adequately represented in Collins's Dictionary of Spanish Proverbs, 1822; and there are similar collections in Chinese, Japanese, Hindustani, Turkish, Persian, Arabic, as well as in Flemish, Russian, German, Dutch, and all other European languages.

Proverbs, Book of. One of the most important of the books of the O.T., belonging to a class of Hebrew writings called Wisdom Literature. The full title is "The Proverbs of Solomon, son of David, King of Israel" (i, 1). The book is a compilation of wise sayings and proverbs, and not, it would appear, the work of a single writer. Other authors besides Solomon are mentioned, such as Agur, the son of Jakeh (xxx, 1), and King Lemuel (xxxii, 1). To a collection of proverbs known as the Proverbs of Solomon were added presumably other collections of various dates and origins, but the fame of Solomon (cf. 1 Kings iv, 32), whose name became a symbol for wisdom, led to the retention of the original title for the whole compilation.

C. H. Joy (The Book of Proverbs 1899, in The International Critical Commentary) describes the divisions of the book as follows: 1, a group of discourses on wisdom and wise conduct, i-ix; 2, a collection of aphorisms in couplet form, x, i-xxii, 16; 3, two collections of aphoristic quatrains, xxii, 17-xxiv, 22 and xxiv, 23-34; 4, a collection of aphoristic couplets, xxv-xxix; 5, a collection of discourses of various characters, xxx and xxxi. All these sections inculcate "certain cardinal social virtues, such as industry, thrift, discretion, truthfulness, honesty, chastity, kindness, forgiveness, warning against the corresponding vices, and praise of wisdom as the guiding principle of life." The philosophy and ethics of the book have much in common with those

of the other products of the Wisdom Literature (Job, Ecclesiasticus, Ecclesiastes, and Wisdom of Solomon). This suggests that the Book of Proverbs as a whole belongs to the post-exilic age.

G. Currie Martin has contributed a short but scholarly commentary on the book to the Century Bible. See Bible.

Providence. City of Rhode Island, U.S.A. It is the state capital, the second largest of the New England cities, and the co. seat of Providence co. A seaport, it stands at the head of navigation of Providence river, 45 m. S.W. of Boston, and is served by the

fisheries are valuable. Settled in 1636, it was incorporated in 1862. Pop. 21,800.

Province (Lat. *provincia*, territory, etymology doubtful). Word specifically applied to the district round about Massilia (Marseilles), which, as Rome's first conquest outside the Italian peninsula, was known as the Province and which is still called Provence. Successive conquests were formed into provinces for administrative purposes, Britain being one, and the term subsequently was used in a wider, more general sense. France before the Revolution was divided into provinces, which at an earlier date had been separate kingdoms or semi-independent territories. The dominion of Canada, too, is made up of federal provinces, and the term is also applied to administrative divisions in several other countries of the world, e.g. the provinces of S. Africa.

Foreecclesiastical purposes England and Wales are divided into



New York, New Haven and Hartford and other rlys., and by ocean-going steamers. Among the city's prominent buildings are the state house, Roman Catholic cathedral, Butler and Rhode Island hospitals, the Athenaeum, and a public library.

The chief educational institution is Brown University, with fine buildings, founded in 1764, with which are associated several museums and Ladd Observatory. A large quantity of coal is shipped, and among the principal manufactured products are jewelry, cotton, woollen, and worsted goods, and machinery. South of the city is Roger Williams Park with a statue of Roger Williams, who first landed at What Cheer Rock. Providence was settled in 1636, and chartered as a city in 1832. Pop. 237,000.

Providence, East. Town of Rhode Island, U.S.A., in Providence co. It stands on Narragansett Bay and on the W. bank of the Blackstone or Seekonk river, facing the city of Providence. It is served by the New York, New Haven and Hartford and other rlys., and has bleach works and paper mills, besides manufactures of wire, chemicals, and optical goods. Its oyster



Providence, Rhode Island, U.S.A. State House, opened in 1900; top, left, Soldiers' Gate at the entrance to Brown University

three provinces, Canterbury, York, and Wales, each being under the jurisdiction of an archbishop, and the term is also used in connexion with the Anglican Church overseas.

Generally, the provinces are contrasted with the metropolis of a country. In a figurative sense, province means the proper sphere or function of a person or body of persons, e.g. "That is not within the province of the legislature."

Province Wellesley. That portion of the colony of Penang lying on the mainland of the Malay Peninsula. Averaging 8 m. in width, it extends along the coast for 45 m. facing the island of Penang (*q.v.*), in the N. part of the Straits Settlements, touching Kedah on the N. It produces rice, pepper, spices, sugar, and tobacco. It was taken over by Gt. Britain in 1798. The chief town and seaport is Prai (*q.v.*). Area, 280 sq. m. See Penang.

Provincial Letters. THE. Familiar name of a series of 18 letters by Blaise Pascal, published under the pseudonym of Louis de Montalte, and supposed to be sent by a Parisian to a friend in the provinces. The letters, published between Jan. 13, 1656, and Mar. 24, 1657, embody an ironical attack on the Jesuits, rendered in singularly clear and powerful language. The standard English translation is that by Thomas McCrie, 1847. See Jansenism; Pascal; Port-Royal.

Provins. Town of France, in the dept. of Seine-et-Marne. It stands on the Voulzie, 59 m. S.E. of Paris. The 11th century Romanesque Gothic church of S. Ayoul, the 12th century Transitional church of S. Quiriace and its contiguous bell-tower, the Grosse Tour, the 13th century church of Ste. Croix, and town hall are the main historic edifices. The town is noted for its rose culture. The Roman Pruvium, and a medieval industrial city, with a pop. of 80,000, it has declined since the Hundred Years' War. Pop. 9,000.

Provision (Lat. *pro*, before; *videre*, to see). Act of providing, something done deliberately beforehand. In the plural it is a synonym for food. Legally, a provision is a clause in a will or deed, and in this sense it is used in constitutional history, e.g. the provisions of Oxford. The word is sometimes spelled proviso. Ecclesiastically, provision refers to an appointment by the pope to a benefice, but this question is more usually dealt with under the form provisor (*q.v.*).

Provisional Order. In the United Kingdom, an order granted under statutory powers by certain government departments, authorising local undertakings of public usefulness, e.g. housing, harbour, gas and water works, etc. Such orders are subsequently confirmed by statute. They obviate the difficulty and expense of getting private bills through Parliament. See Bill; Parliament.

Provisions of Oxford. Plan for the better government of England formulated by the barons in 1258. In May the barons compelled the king to agree to the appointment of a committee of 24 persons to carry out certain reforms in the government necessitated by his extravagance. A parliament therefore met at Oxford to choose them, and Henry was allowed to nominate twelve.

The provisions drawn up by this body and accepted by the king provided for a standing council of fifteen members to advise and control the king, for another council

of twelve to consult three times a year with the standing council, and for a third council of 24 to make grants of money. All aliens were to be removed from office and expelled. The work of reform began with the appointment of new ministers and the flight of the aliens. The new constitution only worked until the end of 1259. By that time the barons were quarrelling amongst themselves, and in 1261 Henry, taking advantage of the position, obtained a papal bull releasing him from his obligation to observe the provisions.

Provisor. Literally, one who provides. In ecclesiastical language a provisor is one to whom the pope has granted the right of having the next vacancy in a benefice. The statutes of provisors were laws passed by the parliament of England in 1351 and 1390. The first recited a statute against papal aggression passed in 1307, declared invalid all ecclesiastical appointments secured by papal provision, and ordered the imprisonment of all who accepted such. The statute of 1390 re-enacted the one of 1351, but made the penalties more severe. See Praemunire.

Provo. City of Utah, U.S.A., the co. seat of Utah co. It stands on the Provo river, 47 m. by rly. S.E. of Salt Lake City, and is served by the Denver and Rio Grande Rly. A Mormon city, it is the seat of Brigham Young University, and has a Mormon tabernacle. Woollen goods, tin roofing, and flour are manufactured, and a trade in lumber is carried on. Agriculture, stock-raising, and fruit-growing are important industries. Provo was settled in 1849, and became a city in 1851. Pop. 10,300.

Provost (Lat. *praepositus*, placed before). Chief municipal magistrate of a city or burgh in Scotland. The provosts of Edinburgh, Glasgow, Aberdeen, Perth, and Dundee are styled lord provosts. During office, the lord provost of Edinburgh is entitled to the prefix right honourable. The term is also applied to the heads of certain colleges, e.g. provost of Eton, King's College, Cambridge, Queen's College, Oxford. Pron. Prov-ost.

Provost Marshal. Officer appointed on a campaign to be chief of the military police. He wears a badge, "P.M.," on his left arm; he receives instructions from the adjutant-general and is attached to G.H.Q. His assistants secure all persons found without passes, collect stragglers, and guard against spies; they arrest military offenders against the rules of the service, keep records of field general

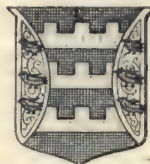
courts-martial, and carry out the sentences. In 1915 assistant provost marshals issued passes to the inhabitants and requisitioned buildings, etc., in the United Kingdom. Soldiers employed as military police under the provost marshal wear a badge marked "M.P." In peace an organization called the corps of military police (mounted and foot) is maintained for disciplinary duties in camps and garrisons. Pron. Pro-voh.

Prox. Abbrev. of Lat. *proximo* (mense), in, or of, next month.

Proxy (late Lat. *procuratia*, acting for another). Term used for a person who acts for another, and also for the authority by which he acts. It is chiefly used in connexion with voting. In the United Kingdom company law allows the employment of proxies, and many shareholders authorise a director or someone else to use their voting powers. These may be either general or special, and the proxy must bear a penny stamp. Proxies are also used in bankruptcy proceedings. Proxies are not allowed in political voting, but voting by proxy was allowed in the House of Lords until 1868. They are permitted in convocation and in the political conventions of the U.S.A. See Proctor; Vote.

Prudential Assurance Co. British insurance company. Established in 1848, its founders devoted themselves mainly to insuring members of the working classes for small sums, collecting the small premiums weekly, this being then a new field. The business prospered enormously, and, although new departments were opened, insurance of this kind remains the company's staple. The company has in force over 25,000,000 policies, invested funds to the amount of £125,000,000, and has paid claims of £185,000,000. Life, fire, accident, burglary, and annuity business is transacted, while the company has a department for health insurance. It has agents in every town and almost every village of the United Kingdom, and the head offices are at Holborn Bars, London, E.C. See Friendly Societies; Insurance.

Prudentius (c. A.D. 348-410). Christian poet, whose full name was Aurelius Prudentius Clemens. Born in Spain, probably at Saragossa, he practised as an advocate, held several provincial appointments, and lived for some time at



Prudential Assurance Co. arms

the court of Honorius. Having lost the imperial favour, he retired to a monastery, and wrote religious poems, to atone for a misspent youth. His chief works, hexameters and lyrics, all the titles of which are in Greek, are Cathemerinôn, prayers for daily use; Peristephanôn, acts of martyrs; and Hamartigenia, the origin of evil. See Translations from Prudentius, F. St. John Thackeray, 1890.

Prudhoe. Village of Northumberland, England. It stands on the Tyne, 11 m. from Newcastle, with a station on the N.E. Rly. Near are the ruins of Prudhoe Castle. Built by the Normans, it was defended against William the Lion in 1174, and later became the property of the Percys. The chief industry is coal-mining. Pop. 4,700.

Prudhoe Land. Coastal tract of N.W. Greenland. It is situated N. of Hayes Peninsula, and is indented by Inglefield Gulf, which contains several small islands. It contains the settlement of Etah.

Prud'hommes, CONSEILS DE (Fr., councils of discreet men). Commercial and legal tribunals in France of men of known sagacity. Originally a medieval institution, the Prud'hommes assembled in the larger towns to adjudicate in commercial disputes. The Conseils were revived by Napoleon in 1806, and have been carried on by the Third Republic.

Prud'hon, PIERRE PAUL (1758-1823). French painter. Born at Cluny, April 4, 1758, of poor parents, he studied at the Dijon Academy and in Italy. He returned to Paris in 1789, and after a hard struggle with poverty, won reputation as an historical painter. His principal work was the decoration of the Louvre with ceiling and other paintings. He died in Paris, Feb. 16, 1823. See Marie Louise.

Prune (Lat. *prunum*, a plum). Dried fruit of various plum trees grown in France, Portugal, other European countries, and America, especially in California. The plums are dried slowly and with much care, the best being sun-dried. They are eaten dry, or soaked and stewed, and are valuable for their laxative quality.

Prunella or PRUNELLO. Stout silk or worsted stuff formerly used for clergymen's and barristers' gowns. The word probably comes from French *prunelle* (sloe), in allusion to the colour of the cloth. The term was later applied to a doeskin twill.

Pruning (old Fr. *proignier*). In gardening, the process of cutting away superfluous stems, branches, and other wood from a tree, in order to induce healthy growth and in-



Pruning. 1. High-headed tree which requires pruning. 2. Same tree after smaller branches have been pruned away; white line shows where top should be cut. 3 and 4. Two-year-old nursery tree before and after pruning

creased productivity of flowers or fruit. Newly planted standard roses, shrubs, and fruit trees should be pruned somewhat severely, in order to ensure the future shape and welfare of the tree or bush. If the scion has only two shoots, both should be cut back to a point as near to a bud as possible. This will result usually in the appearance of four healthy shoots the second year, and these in turn should be cut back to a bud, with the expectancy of the establishment of eight good branches in the third season. After that, pruning is at discretion, the chief object being to keep the branches from crossing each other and becoming tangled, and also to maintain the centre of the tree in a free and open condition, to ensure the admittance of light and air.

The actual cut should sever the stem at an angle of approximately 45°, and the operation is usually carried out with a pruning knife. Large limbs require to be pruned with a handsaw. February and March are the best months in which to carry out all pruning, just before the sap commences to

rise in the stems. Natural climbing plants, such as clematis, do not require much pruning. Summer pruning is the simple operation of pinching off the tops of side shoots in early summer, in order to get fresh breaks from the upper buds. See Gardening; Root.

Prunus. Genus of trees of the natural order Rosaceae. Natives of the N. temperate zone, many cultivated varieties yield valuable fruit, e.g. plum (*P. communis*), peach (*P. persica*), and cherry (*P. cerasus*). See Cherry; Cherry Laurel; Fruit; Peach; Plum.

Pruritus. Itching of the skin without signs of local disease. It is most common between the ages of 30 and 40. The condition is most frequently of a neurotic nature, and may occur in persons who are worried or overworked. It may be made worse by cold or hot baths, and attacks appear to be brought on sometimes by certain articles of diet, such as shell-fish, coffee, and alcohol. Lotions containing preparations of tar, carbolic acid, salicylic acid, resorcin, menthol, and other substances, may be applied, but are often without effect.

PRUSSIA: MONARCHY AND REPUBLIC

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This Encyclopedia contains articles on the cities, towns, rivers, etc., of Prussia, e.g. Berlin; Oder. See Germany; Hohenzollern; and the biographies of Frederick the Great, Moltke, and other Prussian kings and soldiers; also Franco-Prussian War; Seven Weeks' War

Prussia is a republic of Europe, the largest state of the German Reich. Before 1918 it was a kingdom in the German Empire. Its area is approximately 113,000 sq. m., being about 20,000 sq. m. less than before the Great War, and the population of about 37,000,000 shows a loss of about 4,000,000.



Prussia, arms of the former kingdom

It is divided into 14 provinces, of which Berlin forms one. Berlin is the capital and the largest town; other large places are Cologne, Breslau, Essen, Frankfurt, Duisburg, Königsberg, Stettin, and Kiel. Prussia occupies broadly the area of the central lowlands in the N.W. of Europe. It marches with the Netherlands and Belgium on the W., with other German republics and Czecho-Slovakia on the S., and with Poland on the E. It comprises nearly the whole of the German coastal areas on the North and Baltic Seas. The prov. of E. Prussia is a detached area between the Baltic Sea and Poland. Prussia includes the S. part of Schleswig-Holstein, a large part of the Rhine valley, the rich mineral district of Westphalia, Hanover, much of what was once part of Saxony, Pomerania and most of Silesia (*q.v.*). The chief rivers are the Rhine, Elbe, Oder and Weser. Prussia's chief industrial areas are Westphalia and Silesia with their rich coal and iron mines, and large manufacturing centres. Agriculture is widely practised.

Constitution of the Republic

Prussia was declared a republic in Nov., 1918, and the present constitution was adopted in Nov., 1920. The state is a republic and each citizen, of either sex, and, in general, 20 years of age, shares in the direct, secret and equal suffrage. The diet (Landtag) is elected by proportional representation and direct and secret ballot; in Feb., 1921, of 428 members, there were 114 majority socialists, 81 centre Catholics, 75 national German party, 58 German people's party, and 100 representing other groups. A state council (Staatsrat) elected by the provincial assemblies on a basis of one representative per 50,000 pop. has the right of rejecting legislation formulated by

the diet. The ministry exercises the powers formerly wielded by the sovereign; the premier is elected by the diet. Prussia had, in 1921, 22 of the 55 members of the Reichsrat of the German republic.

Development of the State

The history of the development of the modern Prussian state falls broadly into six main phases: (1) The period anterior to the vesting of the first Hohenzollern elector with the mark of Brandenburg (1415); (2) the period of the Renaissance, Reformation, and Thirty Years' War, 1415 to 1640; (3) the period of the Hohenzollern rule from the Great Elector (1640) to the death of Frederick the Great (1786), in which Prussia became a monarchical and military state of the first rank; (4) the Prussian monarchy from 1786 to the death of Frederick William III (1840); (5) the age of the Revolution, of William I and Bismarck (1840-1890), in which Prussia established a Prussian supremacy in Germany; (6) the personal rule of the Emperor William II, actually from 1890, when Bismarck was compelled to resign, to Nov. 13, 1918, when he abdicated.

Historic Prussia starts with the electorship of Brandenburg, by imperial grant to the first Hohenzollern, Frederick I. Strictly speaking, Brandenburg-Prussia did not exist until 1660; but the nucleus and basis of the modern Prussian monarchy and state were laid in the consolidating achievement of the Hohenzollern electors between 1415 and 1618. Four points are of especial importance: (1) The conversion of the electors to the Protestant Reformation, by which Brandenburg henceforward ranked as a Protestant state; (2) the *Dispositio Achillea*, by which the division or alienation of the electorate was forbidden; (3) the claim to the succession of the duchies of Cleves and Juliers on the Rhine was asserted; and (4) the acquisition under Polish suzerainty of the secularised duchy of East Prussia.

Brandenburg was now linked with one half of the important duchy of Prussia east of the Oder and the Vistula. The Thirty Years' War (1618-1648) was an evil time for Brandenburg, and its fortunes sank very low; but with the accession (1640) of the great elector began the period in which the foundations were laid, and the

consolidation of the modern and historic Prussia was consummated. This was essentially the work of three rulers, Frederick William, the Great Elector (1640-86), his grandson Frederick William I (1713-40), and Frederick II the Great (1740-86).

The characteristics of their rule, which was continuous in policy and aims, can be summarised as the extension and holding together of the territorial state; the conversion of the electorate into a kingdom (1701); the formation of a powerful standing army, which gave the state a peculiarly military character; the extirpation of popular and local liberties, and the subordination of all classes to an absolute prerogative; the formation of a centralised and efficient bureaucracy by which the civil administration was concentrated in the ruler's hands; the retention of the feudal organization of society enabling the crown to govern through the nobility, which had been reduced to complete obedience to the sovereign; and the adoption of a policy which made the interest of the dynasty identical with the interest of Prussia.

18th Century Wars

To these Frederick the Great added, besides his personal genius in war, administration and diplomacy, the conception of "the enlightened monarchy"—a supremely efficient and scientific sovereign achieving through his unfettered prerogative the maximum of material benefit for his subjects. Frederick II fought two great wars, the first from 1740 to 1745 to wrest Silesia from the House of Austria; the second, the Seven Years' War, to retain it against a coalition of Austria, France, Russia, Sweden and Saxony. He inaugurated a new departure by the first partition of Poland (1772) by which West Prussia was absorbed, the annexation of Prussia proper completed, and the Prussian state extended from Königsberg to Magdeburg.

At his death in 1786 Prussia was a European power of the first rank. The kingdom comprised Prussia proper (East and West duchies), Pomerania with the naval port of Stettin, the mark of Brandenburg, a group of lands ranged round the secularised bishopric of Magdeburg, the duchy of East Frisia, and the duchy of Cleves, the whole forming a state which made Germany north of the river Main its sphere of influence.

The next phase in its evolution (1786-1840) was marked by great vicissitudes. Frederick William II (1786-1797) plunged Prussia into



Prussia. Map of the republic which was divided into two parts by the Treaty of Versailles, June 28, 1919. Inset, the detached portion of East Prussia

the war with the French Revolution, to withdraw in 1795, defeated and exhausted; he completed the partition of Poland (1793-95), adding enormous blocks of Polish territory. His successor, Frederick William III (1797-1840), remained neutral until 1806 and then challenged Napoleon. The catastrophe of Jena and military collapse were the results. The treaty of Tilsit (1807) tore away all the territories west of the Elbe, and deprived the kingdom of all the Polish lands acquired in 1793 and 1795. Memorable internal reforms were carried out by Stein and Scharnhorst. Feudalism in the land was largely abolished; self-government imposed on the cities; the administration was renovated and the army remodelled; a new and great university was founded at Berlin. In "the War of Liberation" (1813-15) Prussia contributed signally to the overthrow of Napoleon.

The treaty of Vienna (1815) created a new Prussia. In the west a large block of territory on both banks of the Rhine made Prussia a guardian of the greatest German river; one-half of Saxony added to the original nucleus on the Elbe made the core of the state; the elimination of much of the purely Polish territory to the west of the Vistula strengthened the Germanic character of the state, while the fortress of Thorn supplied a central strategic point for retaining

the connexion between Königsberg and Berlin. Between 1815 and 1840 the bureaucratic administration was immensely strengthened and improved; a policy of economic free-trade inaugurated, and the scheme of a great Prussian tariff-union (Zollverein), absorbing the German States into a single fiscal unit under Prussian direction, was promoted with great success.

Relations with Austria

The reign of Frederick William IV (1840-1861) was memorable only for the failure of the Revolution of 1848 to master Prussia, the failure of the king's ambition to unite the German princes and principalities in a league under Prussia, and the complete subordination of Prussia to Austria in foreign policy. The problem of Prussia's future had not been solved, but postponed. Four solutions in an age of rampant German nationalism were possible: a division of Germany between Austria and Prussia; a democratic unification of Germany in which Prussia would be absorbed and cease to be a separate state; the unification of Germany by Austria, reducing Prussia to political and military subordination; or the unification of Germany by Prussia and the exclusion of Austria from the new German state. With the accession of William I (1861) began the decisive age of Bismarck.

Bismarck made the Prussia of

the last half of the 19th century. He defied the Liberals within and without the kingdom and was determined to retain Prussia territorially intact as an autocratic and militarist monarchy. The war of 1864 enabled him to annex from Denmark the duchies of Schleswig and Holstein, ceded to a condominium of Austria and Prussia; in 1866 Austria was challenged and defeated at Sadowa. The German Confederation of 1815 was dissolved; a new North German Confederation, on a feudal basis with the supremacy of Prussia recognized, was set up; Prussia annexed Schleswig, Holstein, Nassau, Hesse, Hanover, and the city of Frankfurt; Austria was excluded from Germany; the southern German states were left politically independent, but economically at Prussia's mercy.

Inside the federation Prussia remained untouched in structure, government, and character; territorially she now comprised two-thirds of Germany; her military alliances with the southern states and her completion of the tariff-union riveted her control over Germany.

Three years of military preparation consummated the work of 1866, when in 1870-71 France was overthrown, and Alsace and Lorraine were annexed to the new German empire, proclaimed at Versailles, Jan. 18, 1871. This empire was virtually the North

German Confederation of 1866, with Bavaria, Baden, and Württemberg added. The imperial crown was made hereditary in the House of Hohenzollern, and the control of the empire by Prussia in the army, legislature, finance, and administration was continued. The "new empire" was simply "an extended Prussia," and the function of Prussia to Prussianise Germany with her efficiency, her institutions, and her principles of policy became a settled ambition.

Prussian history after 1871 is the record of a double movement, the two parts of which are closely inter-related—the steady infiltration of Germany with Prussian organization, institutions, and political spirit; the determination of the Prussian sovereign and the ruling noble caste to preserve intact the essential characteristics of the historic Prussia—government by a personal monarch, the director as well as the head of the Prussian state, the political monopoly of a governing class, united by interest with the crown, the supremacy in the last resort of the army and its military chiefs, and the refusal of all reforms for liberalising the constitution or leading to a constitutional monarchy and parliamentary government.

Political Principles

After 1866 Prussia made no annexations. Her boundaries were those determined by the settlement after the war with Austria. But the forcible Prussianisation of Alsace-Lorraine and Schleswig, the prolonged and bitter struggle with the Prussian Poles in the province of Posen and Upper Silesia, the conflict with the Roman Catholic centre (the Kulturkampf), 1872–1887, and the struggle with the socialist democrats, together with the rejection of all proposals to amend in a liberal sense the Prussian constitution, which remained the most conservative of all the German states, were proofs of the solidarity and strength of the framework created by the Hohenzollern dynasty. The greatest instrument of all—the Prussian army—was never "imperialised." It remained purely Prussian, and through its great general staff was the potent organ by which the armies of the federated German states were remodelled on the Prussian type.

No less potent was the Prussianisation of education and of the universities. The university of Berlin in the sphere of intellect became what the Prussian staff was in the sphere of military organization. The emperor Wil-

liam II (1888–1918) was as Prussian as any of his predecessors. His dismissal of Bismarck (1890) was a proof of his determination to govern as well as to reign, and of the power of the Prussian monarchy. "The world-policy," with its corollary the creation of a great navy and colonial possessions, was a product of the German empire, but its realization rested on Prussian power, methods, and principles of action. Hence the ambitions of the new Germany after 1890 became a great menace because they were typical of the state which had been made between 1640 and 1871, the characteristics of which were a unique and original combination of dynastic autocracy with oligarchic bureaucracy, fused together by reliance on an army which was a nation in arms, controlled by a single individual in the person of the sovereign.

Historic Prussia represented the realization of the principle that "the state is power," coupled with the organization of force in its most scientific and ruthless form. Critics within and without, before 1914, predicted that such a state could not be mended, and could only be ended. A revolution alone could dissolve it, and a revolution could only be created by military defeat, i.e. by the failure of the state to justify its claims and its character by success. The revolution of Nov. 13, 1918, seems to endorse the accuracy of the prediction.

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Prussia, EAST. Detached prov. of Prussia, Germany. With part of the border province, created in 1919, it is situated between Poland and Lithuania, with Poland also to the S. The Niemen or Memel area in the N.E. between that river and Lithuania has been detached and is administered by the League of Nations. Most of the Baltic coast is occupied by the Frisches and the Kurisches Haff, and is bordered with sand dunes. Inland is an area of moraine-dammed lakes; in the S.E., the Masurian Lake district, most of the lakes lie on the gentle plateau-like ridge, which is on the average less than 1,000 ft. in elevation. Infertile sandy soil and peat bogs further limit the cultivable area, which comprises less than half the province. Coniferous forests cover a fifth of the area. Rye, flax, and potatoes are produced in the valleys of the chief

ivers, the Pregel and Passarge. Lumbering centres on Allenstein, horse-rearing on Gumbinnen. Amber is obtained in Samland, the coastal dist. between the Haffs. Königsberg is the chief town. Its area is 14,286 sq. m. Pop. 2,229,000. See Masurian Lakes.

Prussia, WEST. Former prov. of Prussia, Germany. By the treaty of Versailles, the western portion was divided between Poland, to make the Polish corridor, and the free city of Danzig. Formerly it comprised 9,863 sq. m. with a pop. of 1,700,000. The portions of Posen and West Prussia still German now comprise the border province with an area of 3,026 sq. m., and a pop. of 327,000. The German remnant E. of the Vistula, is a Baltic lakeland sloping gently to the Frisches Haff. It is a level district in which rye, potatoes, flax, and sugar-beet are grown.

Prussian Blue. Dark blue colouring matter. It was first made accidentally early in the 18th century by a Berlin artist named Diesbach. The compound was investigated by Scheele, Berthollet, and Gay-Lussac, and is made by adding potassium ferrocyanide to a solution of ferric chloride or ferric sulphate, and washing and drying the precipitate. If potassium ferricyanide is employed, Turnbull's or Gmelin's blue is obtained. Another variety is Williamson's blue. Varying mixtures of these three blues produce the different shades of Prussian blue.

Prussian

Guard. Corps of the German army as it existed till 1918. Its nucleus was one of the regiments of guards maintained by the kings of Prussia. When the Prussian army was organized in the 19th century, these were formed into a corps of two divisions of infantry, each of four regiments and twelve battalions, in addition to cavalry and artillery, and a battalion of riflemen. It numbered about 40,000.



Prussian Guard, Lieutenant in full uniform

This corps was regarded as one of special valour, and obtained the pick of the recruits. It was therefore called upon in times of special need, as at St. Privat, in Aug., 1870, and at Ypres, in Nov., 1914. See Goose Step.

Prussic Acid. Common name for hydrocyanic acid (*q.v.*). It was so called by Guyton de Morveau because the acid can be made by distilling Prussian blue.

Pruth. River of Central Europe, a left bank tributary of the Danube. It rises in the Carpathians, flows through Galicia and Bukovina, and then through Rumania, where it separates Bessarabia from Moldavia. It has a swift course, and is used for floating timber; boats can reach Jassy, 170 m. upstream. Its length is 500 m. It was prominent in the Great War. See Bukovina.

Prynne, WILLIAM (1600-69). English Puritan. He was born at Swainswick, Somerset, and edu-



William Prynne,
English puritan

cated at Bath Grammar School and Oriel College, Oxford. Called to the bar in 1628, at Lincoln's Inn, he early began the writing of polemical pamphlets, and in 1632 produced *Histriomastix*, an attack on stage plays and their players, which violently offended the court. The author was prosecuted in the Star Chamber, fined £5,000, expelled from his university and Lincoln's Inn, pilloried, had both his ears cut off, and was condemned to perpetual imprisonment. Although in prison, he managed in 1636 to get another pamphlet printed, which gained him a similar sentence, including the shearing off of the stumps of his ears and branding on the cheeks. In 1640 the Long Parliament declared his sentence illegal, and awarded him £4,000.

He sat in Parliament for a time for Newport, Cornwall, and in 1647 was appointed recorder of Bath. After the Restoration he became member of Parliament for Bath, was appointed keeper of the records in the Tower, and published some valuable historical materials. He died in Lincoln's Inn, Oct. 24, 1669. See Mont Orgueil Castle.

Przasnysz. Town of Poland. It is situated 59 m. N.E. of Plock and 28 m. N. of Pultusk, and is an important road centre, a fact which made it of much strategic value in the Great War. Pop. 10,000. *Pron.* Pzhashnish.

Przasnysz, BATTLE OF. Fought between the Germans and the Russians, Feb., 1915. In mid-Feb., 1915, Hindenburg concentrated two corps at Mlava, Chorzele, and Willenberg, with an immediate view to the recapture of Przasnysz, which they had already won and lost again in the preceding Dec. The fresh attempt on the town began to develop on Feb. 20-22. On the W. the Germans advanced along the rly. from Mlava in the direction of Novo Georgievsk, and on the N. by the roads S. from Chorzele, while from Willenberg farther E. an outflanking column worked down the marshy valley of the Orzyc, a small tributary of the Nareff, the result of these movements being the envelopment of the inconsiderable Russian force which was defending Przasnysz. The Russians were compelled to evacuate the town on Feb. 25, with heavy losses, and, surrounded by the Germans on all sides, were threatened with destruction.

They were saved by the arrival of reinforcements from Ostrolenka and other fortresses on the Nareff. As these reinforcements came on the scene, and deployed to the W. and N., it was the turn of the Germans to be enveloped. For two days, Feb. 26-27, there was very heavy fighting in and about the town, but on Feb. 28 the Germans retreated in disorder back to Mlava and Chorzele, their loss in prisoners alone being about 10,000 men. Advancing up the rly., the Russians drove the defeated enemy on to Mlava. With this serious reverse at Przasnysz Hindenburg's offensive against the Nareff came to an end, and shortly afterwards his attempt against the Niemen and

the Bobr also failed. Przasnysz fell to the Germans later in the year. See Nareff, Battles of the.

Przemysl. Town of Poland, in Galicia, 60 m. by rly. from Lemberg. Formerly an Austrian fortress, designed to watch the passes across the E. Beskids, a section of the Carpathians to the S., it is situated on the San, which gives it easy lines of communication to the Vistula, Cracow, and Lemberg. A hill to the S.W. of the town is crowned by ruins of a castle reputed to have been built by Casimir the Great. Pop. 54,000. *Pron.* Pzhem-isl.

Przemysl, SIEGES OF. After their capture of Grodek on Sept. 14, 1914, the Russians under Brusiloff moved on by the rly. to Moczyska, 15 m. E. of Przemysl, which was their objective. On the S.W. Brusiloff dispatched a force under Dmitrieff to Sambor and Chyrov, the latter being occupied on Sept. 24; Przemysl thus was cut off on the S. Meanwhile, Jaroslav on the N. had been taken and Przemysl was isolated N., E., and S.

The fortress was completely invested by Sept. 27, and summoned to surrender, but its commander, General Kusmanek, refused, and as an effort to carry it by assault failed the Russians settled down to a regular siege. Meanwhile the first German invasion of Poland had begun and simultaneously the Austrian resistance in W. Galicia stiffened. The Russian advance towards Cracow was checked at Dembitsa, about 100 m. from that city, towards the end of Sept., and in the first week of Oct. the Russians fell back to the San.

This movement freed Przemysl on the W., but it was still invested N., E., and S. The Austrians made



Przemysl, Poland. The fortress city of the Carpathians seen from the east, looking towards the river San

a determined effort to relieve it altogether. Heavy fighting took place around it on Oct. 16, and an attempt was made to cross the San on Oct. 18, which failed. For several days there were bitter struggles near Jaroslav, and about Sambor and Sanok, but the Austrians were repulsed, and with their complete defeat early in Nov. on the San, the way was opened for a resumption of the Russian advance upon Cracow, and the lines of investment were drawn tight about Przemyśl again.

Early in Dec., 1914, Hindenburg began an offensive for the relief of Cracow, and it also included operations for the relief of Przemyśl. On Dec. 15 a flanking attack from the passes of the Carpathians resulted in the capture from the Russians of Sanok, on the San, not 30 m. from the fortress, the garrison of which made about the same date a sortie in conjunction with this effort. General Arpad von Tamaszy, at the head of five Hungarian regiments, broke through the line of investment on the S.E., and succeeded in advancing 15 m. from the outer fortifications to Bireoza, on the road to Sanok.

General Selivanoff, who commanded the Russian besieging force of 100,000 men, defeated Tamaszy, and drove him back, with heavy losses, into Przemyśl, after a bitter struggle lasting four days. During Dec. other sorties failed, and by Dec. 25 the counter-offensive of Brusiloff in the Carpathians had completely taken off the pressure from the S. on the investing force, which thereafter made light rlys. round the fortress, and otherwise perfected its position. Another effort made by the Austrians from the passes to relieve Przemyśl in Jan.-Feb., 1915, likewise failed.

The fortress was threatened with famine. The Russians had sapped up to the forts, over against which stood the broader ring of fortifications which Selivanoff had erected. It was known in Austria that Przemyśl was now in desperate straits, and in the beginning of March a new offensive was undertaken across the Carpathians direct towards the fortress, but it got no farther than Baligrod and Lutoviska. Daily the forts of Przemyśl bombarded the Russians with scant results. On March 13 the village of Malkovice, on the N.E. towards Jaroslav, was carried by assault by Selivanoff, who thus breached the outer line of the defence. Consolidating themselves on the ground they had taken, the Russians now began a heavy bombardment.

On March 18 Kusmanek, the commandant, called on his troops to make a last sortie, but the Austrian-Slav regiments would not respond. Yet 30,000 men, including the 23rd Hungarian Division, broke out E. across the plain of the San towards Mosciska, but were driven back with a loss in prisoners alone of 4,000 men. During the night of March 21-22 the garrison blew up the main forts, and at nine o'clock in the morning of March 22 Kusmanek formally surrendered the fortress.

The captured garrison comprised nine generals, 93 superior officers, 2,500 subalterns and officials, and 117,000 rank and file, while 700 big guns were taken.

The Russians, however, were not allowed to keep the fortress very long. The tide of war was soon turned in favour of the Austro-Germans, and as the result of his successful operations in Galicia in April-May, 1915, Mackensen was closing in on Przemyśl. At the end of May the fortress was completely surrounded except for a gap of ten miles, bisected by the rly. to Lemberg, on the E., which the Russians by great efforts kept open for their retreat. As early as May 20 Ivanoff had decided on the evacuation of Przemyśl, but as Mackensen's enveloping moves threatened it, he undertook an offensive, beginning with May 21, which enabled him to carry out his plans.

After its occupation by Selivanoff Przemyśl had been partly put into a state of defence by Artamanoff, who succeeded him as commandant, but it was not in a condition to stand a siege, and the last stages of its resistance really covered the completion of the evacuation. On May 30 Bavarian troops captured the Russian positions on the N. of the outer ring of the forts, these forts being subjected to a violent bombardment. During the night of May 30-31 Austrian troops gained a footing in one of the forts, but were held up and repulsed. On May 31 the Bavarians stormed the forts round Dunkovieski, and the Austrians assaulted Przemyśl from the S. During the night of June 2-3 German and Austrian troops broke through on both the N. and the S., and in the morning of June 3 Austrians and Bavarians entered the town.

P.S. (postscriptum). Abbreviation for postscript.

P.S.A. Abbreviation for Pleasant Sunday Afternoon. The movement for providing people with pleasant Sunday afternoons under religious influences was started by John Blackham of West Bromwich

in 1875, and soon took a firm hold in the midland counties of England, becoming widely known as the P.S.A. The meetings were chiefly organized in connexion with the Free Churches, especially the Congregationalists and Baptists, and the movement spread all over the country. The meetings took the form of gatherings on Sunday afternoons in churches and chapels, separate meetings being held for men and women, when popular music was rendered and addresses of a semi-religious or social character were delivered. In connexion with some of the meetings social and benevolent work of various kinds was organized. In the 20th century the movement became merged in that known as the Brotherhood, of which the P.S.A. was the parent. See Brotherhood.

Psalm (Gr. *psalmos*), a twanging of the strings of a harp). Term for a sacred song accompanied by stringed instruments. The Psalter derives its name from the Gr. *psalterion*, a harp. See Psalms.

Psalmazar, GEORGE (c. 1679-1763). Name adopted by a literary impostor. He is believed to have been born in the S. of France, and to have been educated by the Jesuits, but nothing is known as to his real name. As a young man wandering about on the Continent



George Psalmazar,
Literary impostor

in search of occupation, he gave out that he was a native of Formosa. He was brought to England by an army chaplain, was converted to Christianity, and sent to Oxford by zealous patrons to continue his studies. He published in 1704 a Historical and Geographical Description of Formosa, partly taken from a Latin work and partly invented, with an elaborately invented grammar of the Formosan language. About 1712 he repented of his elaborate imposture, confessed it, and became a literary hack in London, in his later years winning the cordial esteem of Dr. Johnson by his piety. He died May 3, 1763. The following year was published his *Memoirs of —*, Commonly Known as George Psalmazar. See Literary Forgery.

Psalmody. Practice of singing psalms and other spiritual songs. Although the character of the music used by the ancient Hebrews is not known with certainty, it is clear that singing formed an important part of their religious services. The practice persisted

amongst the primitive Christians, who developed it in course of time. The Ambrosian Tones, first systematised in the 4th century, may possibly be traced to a Jewish origin; the Gregorian Tones, in the 6th century, mark a further development. There were three methods of singing the psalms and canticles: (a) responsorial, between a soloist and the choir; (b) antiphonal, between two choirs; (c) direct, sung full, without alternation. For the music to which the psalms were sung see Anglican Chant and Plainsong. See also Hymn; Psalter.

Psalms, Book or. Book of the Old Testament. It is a collection of 150 poems. The designation "Psalms" is derived, like the term Psalter, from the Septuagint. The Hebrew title is "Book of Praise-songs"; and in the Hebrew Bible this book is divided into five smaller books: (1) Pss. 1-41; (2) 42-72; (3) 73-89; (4) 90-106; and (5) 107-150. According to Jewish tradition the fivefold division was intended to correspond to the fivefold division of the Law, i.e. the Pentateuch. Each of the first four books closes with a doxology, and in the fifth book the last psalm seems to serve as such. In the Septuagint sometimes two psalms are united (9 and 10; 114 and 115), or one psalm is divided into two (116; 147).

In the Hebrew Bible and in the Septuagint, all but thirty-four bear titles or superscriptions which make statements about the authorship or occasion of composition, or give musical directions. These, like other O.T. superscriptions, are later additions, being due probably to post exilic editors. Psalms are here assigned to Moses (90); to David (in Bk. I all except 1, 2, 10, and 33; in Bk. II 51-65, 68-70; in Bk. III 86; in Bk. IV 101 and 103; in Bk. V 108-110, 122, 124, 131, 133, 138-145); to Solomon (72 and 127); to Asaph (50, 73-83), Heman the Ezrahite (88) and Ethan the Ezrahite (89), who are reputed to have been founders of the guilds of singers in the Second Temple; and to the Sons of Korah (42, 44-49, 84, 85, 87, and 88), gate-keepers of the Temple (cf. 1 Chron. ix, 19; xxvi, 1-19).

Thus, according to the tradition represented by the titles themselves, the Psalter is a collection of psalms of various authorship. It is also a collection of smaller groups. Other groupings are mentioned, such as the Psalms of Ascents (120-134), that is to say, probably pilgrim songs, sung on the way up to Jerusalem; and some others may be detected, such as Hallelujah-psalms (i.e. Praise-Jehovah

psalms; 111-113 and 146-150), Hallel-psalms (i.e. Praise - him psalms; 113-118), treated as a liturgical unit in Jewish literature, and Hodu-psalms (i.e. Give-thanks psalms; 105-107). The words "Of the Precentor" (or choir-master) with the musical directions in the superscriptions of many psalms suggest that, before the final collection was made, a large collection known as the Precentor's or Choir-master's Psalter was in use already. We learn further from the superscriptions that some of the psalms were sung to the melodies of old folk-songs such as "The Hind of the Morning" (22), "The Lilies" (45), and "The Dove of the Distant Terebinths" (56).

We know from the Second Book of Samuel (i, 17 ff., iii, 33 f.) that David composed funereal elegies, and from Amos vi, 5 that he was a famous musician. It is quite likely, therefore, that he composed religious songs or hymns. But it is felt by many scholars that many of the psalms ascribed to him by tradition reflect the circumstances and feelings of a much later age, some of them those of the Maccabean age. Even Theodore of Mopsuestia (b. c. A.D. 350) was driven to assume that seventeen of the Davidic psalms were "prophetic" of the Maccabean struggles. The expression Davidic Psalter, therefore, would be more correct than Psalter of David. A collection of psalms may have been called Davidic because David was the author of some of them, and was famous as a musician. The poems in the Book of Psalms are not all of equal value. By the side of much that is real poetry there is much that is more commonplace hymnology. But at their best the Psalms are gems of Hebrew religious poetry. See Bible.

M. A. Canney

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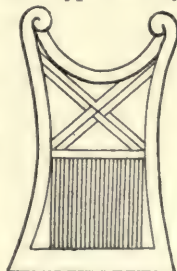
Psalms, PENITENTIAL. Seven of the O.T. Psalms (6, 32, 38, 51, 102, 130, 143), which have been grouped together because they all express the contrition and penitence of the sinner. In the Latin numeration the psalms are 6, 31, 37, 50, 101, 129, 142. Their recitation in Lent was ordered by Pope Innocent III, and Friday (with a few exceptions, such as Good Friday) was the day ordained by Pius V. In the Angli-

can Book of Common Prayer they are given (with the exception of 51) as the proper psalms for Ash Wednesday. Ps. 51 is assigned a separate place in the special Communion Service which is to be used on the first day of Lent (Ash Wednesday), but also at other times. See Miserere.

Psalter. Book containing the Psalms or other hymns, especially metrical paraphrases of the former, either with or without accompanying music. The practice of singing these paraphrases is anterior to the Reformation, but that event gave it fresh vigour in Germany, France, Switzerland, and England.

In England there appeared in 1549 a metrical version of the whole Book of Psalms by Robert Crowley, with accompanying music, and also in the same year a small volume containing nineteen versions by Thomas Sternhold. With the assistance of John Hopkins and other writers it was gradually enlarged in successive editions until in 1562 it embraced the whole of the Psalms, set to 65 different tunes, the melody alone being given. "Sternhold and Hopkins," as it is known, became the authorised version. Later versions, mostly doggerel, were those by Thomas Este, 1592; Thomas Ravenscroft, 1621; N. Tate and N. Brady, 1696. The singing of metrical paraphrases still persists in Scotland, but in England only a few of the finest specimens, such as "All people that on earth do dwell" (Ps. 100), are now used in worship. See Introduction to the Historical Edition of Hymns Ancient and Modern, W. H. Frere, 1909.

Psaltery (Gr. *psalterion*, a harp). Ancient string instrument of a type used by the Jews, the Greeks, and by medieval Europe. Its form and character vary in different countries and periods. It might be square, triangular, circular, and irregular, but it was always played by the fingers, with



Psaltery of medieval design. From a 9th century MS.

or without a plectrum. It was so highly esteemed for its tone and purity as to be frequently introduced into pictures by medieval artists, from which source alone we gain an idea of its character, no specimen of a psaltery being extant. The word as used in the A.V. of the Bible designates the Egyptian *nebel* or portable harp.

Psammetichus. Name of three Egyptian kings of the XXVth dynasty, a grecised form of the Egyptian Psamtek. Psammetichus I (664-610 B.C.) secured the throne by favour of Ashurbanipal, but with Greek mercenary aid threw off the Assyrian yoke. His reign was marked by a vigorous renaissance of art and handicraft. With Psammetichus III, 525 B.C., whom Cambyses overthrew, the Egyptian empire ended. See Naucratis; Tahpanhes.

Pseudonym (Gr. *pseudes*, false; *onoma*, name). Fictitious name, especially one adopted by writers, artists, and actors to conceal identity for legitimate purposes, as distinct from an *alias*, a false name assumed by a criminal to conceal identity.

In journalism, regarded as a distinct branch of literary activity, pseudonymity and anonymity have long been customary, partly because they afforded greater security to free expression of opinion in days when libel law was less precisely defined than now, partly because they prevented the weight of the influence of a periodical publication being diminished by the attribution of its corporate opinion to any single irresponsible and perhaps prejudiced individual. Thus in the journals and also in the controversial pamphlets of the 18th century, the use of pseudonyms was common. Notable examples are the Junius of Philip Francis, The Spectator, and so through the years to Sylvanus Urban of the Gentleman's Magazine, to the Historicus of Sir William Vernon Harcourt, the Toby M.P. of Sir H. W. Lucy, the Claudius Clear of Sir William Robertson Nicoll.

In the department of creative literature the use of pen-names is of more recent origin. It may be due to a native modesty which, as in the case of George Eliot (Mary Ann Evans), is afraid of failure but not of obscurity, or more rarely, as in the case of Fiona Macleod (William Sharp), to a desire to give an air of reality to a second nature consciously self-experienced. Again, it may be due, as in the case of Lewis Carroll (the Rev. C. L. Dodgson), to a prudent reluctance to allow the world at large to become aware of the existence of another, lighter, side to the nature of one engaged in graver academic or other professional work.

PSEUDONYMS AND PEN-NAMES

Adler, Mag., Charles Heber Clarke; *A. K. H. E.*, Dr. A. K. H. Boyd; *A. L. O. E.*, Charlotte Maria Tucker; *Anstey*, F., Thomas Anstey Guthrie; *Ape*, Carlo Pellegrini; *Ayscough*, John, Rt. Rev. Mgr. Count Bickerstaffe-Drew.

Bab, Sir W. Gilbert; *Bartimeus*, L. A. Costa Ricci; *Bede*, Cuthbert, Rev. E. B. Budge; *Bell*, Acton, Anne Brontë; *Bell*, Currer; *Charlotte Brontë*, Bell, Ellis, Emily Brontë; *Bickerstaffe*, Isaac, Dean Swift; *Biglow*, Hosea, J. R. Lowell; *Billings*, Josh., Henry Wheeler Shaw; *Birmingham*, George A. Canon, James O. Hargney; *Boldrewood*, Holly, T. A. Brown; *Bon Gaultier*, Sir Theodore Martin & W. E. Aytoun; *Bowen*, Marjorie, Gabrielle Vere Campbell; *Boz*, Charles Dickens; *Bradton*, M. E., Mrs. John Maxwell; *Breitmont*, H. S., Charles G. Leland; *B. F.*, James Thomson.

Cable, Boyd, E. A. Ewart; *Caran d'Ache*, Emmanuel Poiré; *Carmen Sylva*, Elizabeth Queen of Rumania; *Cheney*, Rev. C. L. Dodgson; *Cartwright*, Julia, Mrs. Henry Ady; *Claudius Clear*, Sir William Robertson Nicoll; *Connor*, Ralph, Rev. Charles W. Gordon; *Conway*, Hugh, F. J. Fargus; *Cornwall*, Barry, B. W. Procter.

Dagone, W. E. Sims; *Dehan*, Richard, Clotilde Graves; *De la Pasture*, Mrs. Henry, Lady Clifford; *Democritus*, Junior, Robert Burton; *Donovan*, Dick, J. E. Preston; *Muddock*, Duncan, Sara Jeannette, Mrs. E. Cotes.

Egerton, George, Mrs. Golding Bright; *Ella*, Charles Lamb; *Eliot*, George, Mary Ann Evans.

France, Anatole, Jacques Anatole Thibaut; *Francis*, M. E., Mrs. Francis Blundell.

Gift, Theo, Mrs. George Boulger; *Gorki*, Maxim, Alexei M. Pyeshkov; *Graham*, Winifred, Mrs. Theodore Cory; *Gray*, Maxwell, Mrs. M. C. Tuttle; *Gyp*, Comtesse de Martel.

Hali Burton, Hugh, James Logie Robertson; *Hay*, Ian, John Hay Beth; *Henry*, O., William Sydney Porter; *Historicus*, Sir William Vernon Harcourt; *Hobbes*, John Oliver, Pearl Craigie; *Hope*, Anthony, S. A. Hope Hawkins; *Hope*, Ascott R., R. Hope Moncrieff; *Howard*, Kebie, J. Kebie Bell.

Inchodaddy, Thomas, Rev. R. H. Barham; *Iron*, Ralph, Olive Schreiner; *Iota*, Mrs. Mannington Caffyn.

John o' London, Wilfred Whittier; *Junius*, still unidentified.

Knickerbocker, Dietrich, Washington Irving.

Lee, Vernon, Violet Paget; *Loti*, Pierre, L. M. Vlaud; *Lyall*, Edna, Ada Ellen Bayly.

Macleod, Fiona, William Sharp; *Malet*, Lucas, Mrs. St. Leger Harrison; *Markham*, Violet, Mrs. James Carruthers; *Mathers*, Helen, Mrs. Henry Reeves; *Meade*, L. T., Mrs. Toulmin Smith; *Merriman*, H. Seton, Mrs. Margaret Scott; *Muddock*, Duncan, Lady Gilbert; *Mulock*, Dinah, Mrs. Craik; *Nesbit*, E., Mrs. Hubert Bland; *North*, Christopher, Prof. John Wilson.

Ogley, Gavin, Sir J. M. Barré; *O'Rell*, Max, Paul Blouet; *Ouida*, Louise de la Ramée.

Page, Gertrude, Mrs. Alec Dobbin; *Page*, H. A., Alex. H. Japp; *Paston*, George, Emily M. Symonds; *Phil*, Habiolt Walgrove; *Pindar*, Peter, Dr. John Walcott; *Potter*, Beatrice, Mrs. Sydney Webb; *Powell*, Mary, Anne Manning; *Proust*, Father, F. S. Mahony.

Q. Sir A. Quiller-Couch.

Red Spinner, William Senior; *Rita*, Mrs. Desmond Humphreys; *Ross*, Adrian, Arthur Reed Ropes; *Ruck*, Berta, Mrs. Oliver Onions; *Rutherford*, Mark, W. Hale White.

Saki, H. H. Munro; *Sand*, George, Mme. Dudevant; *Sapper*, H. Cyril MacNellie; *Schedrin*, Nicolai, M. T. Saltkov; *Sedgwick*, Anne Douglas, Mrs. Basil de Selincourt; *Sharp*, Luke, Robert Barr; *Sinjohn*, John, John Galsworthy; *Skell*, Sam, C. V. Walburn; *Smedley*, Constance, Mrs. Maxwell Armfield; *Spy*, Sir Leslie Ward; *Stendhal*, Marie-Henri Bayle; *Swan*, Annie S., Mrs. Burnett Smith.

Taffrail, Comr. Taprell Dorling; *Thackeray*, Anne, Lady Ritchie; *Thorne*, Guy, Cyril Ranger Gull; *Titmarsh*, Michael Angelo, W. M. Thackeray; *Twain*, Mark, Samuel L. Clemens; *Toby*, M. P., Sir Henry W. L. Tynan; *Katherine*, Mrs. Hinkroy.

Uncle Remus, Joel Chandler Harris; *Vedette*, Howard Hensman; *Voltaire*, Francois Marie Arouet.

Ward, Artemus, Charles F. Browne; *Wiggins*, Kate Douglas, Mrs. G. Rice; *Winter*, John Strange, Mrs. H. E. V. Stannard.

Yorke, Curtie, Mrs. Richmond Lee; *Zack*, Gwendoline Keats.

Pseudopodia (Gr. *pseudes*, false; *pous*, foot). Zoological term for the projections of the body protoplasm in the protozoa by means of which the animal moves about. See Amoeba.

Psilomelane (Gr. *psilos*, bare; *melas*, black). In mineralogy, a hydrous manganese manganate. Dark grey to black in colour, it is one of the most common of the manganese group of minerals. See Manganese.

Psittacus (Gr. *psittakos*, parrot). Small genus of birds of the order Cuculiformes. It consists of the true parrots, natives mainly of Africa. As in all the members of the family Psittacidae, the strongly arched and hooked upper mandible is hinged to the skull, giving the bill great mobility. The tongue is thick and fleshy; and two of the four toes are turned back and two forwards. The best known example of the genus is the Grey Parrot (*P. erithacus*) of Equatorial Africa, whose powers of talking are remarkable. Its general colour is ashy-grey, but the primary wing-feathers are black, and the short tail is red. It is an admirable climber, using its bill as well as its feet. It flies in large flocks at a considerable height, and its wild note is a chattering scream. See Bird; Parrot.

Pskov or **PLESKOV**. Govt. of N.W. Russia. It is bounded by the govts. of Petrograd, Novgorod, Tver, Smolensk, Vitebsk, and Livonia, and its area is 17,000 sq. m. The soil, watered by numerous lakes and streams, is sandy and swampy. Agriculture is the chief occupation, flax, rye, and oats being largely grown; the lumber trade is valuable.

Pskov or **PLESKOV**. Town of Russia, capital of the gov't. of the same name. It stands on the Velikaja and the Petrograd-Warsaw rly., 170 m. S.W. of Petrograd. Its tanneries and leather factories are famous, and there is considerable trade in timber, hemp, and flax. Founded in 965, Pskov was an independent state from 1348 until it was united to Russia in 1510. The old cathedral in the Kremlin, the cathedral of SS. Peter and Paul, and conventual churches are the chief historic buildings.

Psoriasis (Gr. *psora*, scab). Inflammatory infection of the skin. It is characterised by patches covered with white or silvery-grey scales. The cause of this common affection is unknown, but hereditary influences often play a part. The disease is usually first manifested in childhood or adolescence. The lesion begins as a small, round papule, which soon becomes white as the scales form. Ultimately, these develop into patches which may be several inches across. After attaining a certain size they often disappear spontaneously, fading first in the centre. The

parts most frequently affected are the tips of the elbows and the fronts of the knees, and after these the scalp. Recurrence of the condition after it has disappeared is very common. In the early stages, arsenic and salicin administered internally have proved useful, and in some cases administration of thyroid gland has been of service. Attention to diet is important, alcohol being avoided and red meat partaken of sparingly. For local treatment, hot baths, containing a teaspoonful of bicarbonate of soda to the gallon, are helpful. *Pron.* So-ri-a-sis.

Psychasthenia. Disorder of the mind due to abnormal psychological processes. It is characterised by obsessions, the patient feeling compelled to perform useless and illogical acts in order to prevent some calamity happening, though he recognizes the absurdity of his conduct. Spasmodic movements of the muscles are another symptom. Some authorities use the term in a wider sense to include neurotic disorders which appear to be mainly constitutional or inherited. *See* Insanity; Neurasthenia; Neurosis. *Pron.* sikasthenia.

Psyché (Gr., soul). In classical mythology, a maiden so beautiful that she aroused the envy of Aphrodité, who sent Cupid to inspire her with love for the meanest of men. Cupid, however, fell in love with her beauty himself, but left her owing to the machinations of her jealous sisters. Psyche then set out to look for Cupid, and after long wandering was united to her lover and became immortal. The story of Psyche is beautifully told by Apuleius (*q.v.*). It is an allegorical representation of the human soul, which eventually finds complete happiness by purification through trouble and sorrow. *Pron.* Psy-kee. *See* Colour Printing, colour plate; Cupid.

Psychical Research. Term denoting the scientific study of the more obscure and unexplained activities of the human spirit (Gr. *psyché*), or of spirit in general. It became current about 1882, when the society for psychical research was founded by Henry Sidgwick, F. W. H. Myers, E. Gurney, and others for the serious study of thought transference, apparitions and haunted houses, hypnotism, trances, clairvoyance and spiritualistic phenomena. Modern men of science, with few exceptions, dismissed all these things as belonging entirely to the realms of superstition and fraud. The founders of the society took another view. They held that the persistent

belief of mankind in supernormal occurrences must have been kept alive by some facts, and they determined to submit those facts to sober scientific inquiry.

Time has already justified the society in respect of part, at least, of its programme. Hypnotism, once left to the quacks and daring showmen, has been definitely annexed by science, and is recognized as a legitimate therapeutic agency. Automatic writing, in which the hand of the scribe writes, without his will, matter of which he may have no conscious knowledge, has been proved to be a genuine phenomenon, and, taken with the facts of hypnotism, has largely suggested the idea of the unconscious self, which plays so important a part in the latest psychology. The "thought reading" of the popular



Psyche as depicted by Lord Leighton in his painting *The Bath of Psyche*

Tate Gallery, London

entertainer is probably nothing but clever trickery; nevertheless most workers in this field agree that genuine telepathy—i.e. the influence of mind on mind apart from the recognized channels of communication—actually takes place. Careful investigation has also produced evidence that the ancient belief in the power of certain persons to detect water and minerals by a divining rod is not without foundation.

Visions and Apparitions

The careful inquiries of the society leave little, if any, room for doubt that many persons in a perfectly normal state of mind and health, but perhaps endowed with special sensibility, have from time to time seen visions or apparitions of friends or strangers, sometimes living, sometimes dead. The records contain many apparently well-substantiated cases in which the phantasm has occurred at or near the time of death of the person seen, or when he was in critical danger, and a certain number in which the actual details of the event were presented. And it is difficult to brush away the evidence that in some instances apparitions "haunt" definite places. The establishment of the facts is one thing, their interpretation another, and an extremely difficult one. Some inquirers would explain them by telepathy from the living or the dead, or by the emergence into consciousness of knowledge previously unconscious; others have indulged in the speculation that there may be a "cosmic reservoir" in which, so to speak, all human experiences are stored, and from which they may be drawn again in favourable circumstances.

Interest in psychical phenomena naturally centres upon the question how far they yield trustworthy evidence of survival after death. Apart from the study of alleged phantasms of the dead, inquiry into this most obscure subject has taken two main directions. The first is the study of the utterances of "trance-mediums," of whom Mrs. Piper is the best known, which often purport to give communications from the dead to their living friends. The difficulty here is to exclude the possibility that the medium, even without intended fraud, may make use of conscious or unconscious knowledge, of indications given unwittingly by the visitors, or of telepathic communications from living persons. The second direction is the study of cross-correspondences between automatic writings. In some instances automatic writers, unknown to one

another and of unimpeachable honesty, have produced scripts which were unintelligible until one was supplemented by the other; and it has been supposed that in such cases a disembodied intelligence has deliberately given his message in part to each writer, in order to demonstrate his continued existence.

Among abnormal physical phenomena, violent movements of furniture, crockery, etc., without ascertainable cause except the presence of a medium, have often been described and have been popularly attributed to tricky sprites called Poltergeists. The power claimed by some mediums of moving objects, such as tables, without ordinary material contact, deserves, and has recently received, more serious examination. This is, however, a region where a fraudulent medium has peculiar opportunities, and it would be premature to say that any certain results have been obtained. See Dream; Haunted Houses; Medium; Poltergeist; Spiritualism.

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Psycho-analysis. Method of investigating the processes of the mind, and the fundamental motives of conduct. The system was devised and named by the Viennese psychologist, Sigmund Freud (*q.v.*), whose work on the subject, though developed and modified by other investigators, is still accepted as the authoritative body of principles and practice of the psycho-analytic school. Based originally on researches into abnormal or neurotic mental states, the Freudian theory has not only done much to provide a new therapeutic system for such cases, but has also thrown a fresh light on normal psychological processes.

By the psycho-analyst the human mind is conceived as a single entity, but as having two distinct but interdependent aspects, the "conscious" and "unconscious" mind. The former is that which feels and reasons actually and in the present. The latter is conceived as a psychic region which contains the forces collectively described as memory, instincts, habits, etc., and is not directly known to the working conscious

mind. Self-centred and primitive, the unconscious mind preserves, active but latent, those desires and impulses which socialised life obliges everyone to "repress" from the upper consciousness, and are seen openly active in the infant or the savage.

Between the conscious and unconscious minds there is frequently a conflict; a strong, primitive desire is stifled because, through reasons of social expediency or moral constraints, it cannot be gratified; in other words, it is "repressed." And the psycho-analyst attaches great importance to such repressions. The internal struggle of the mind thus created may show itself in a serious and lasting neurosis, or merely in some action unimportant in itself, but explicable only with reference to the hidden and unknown desire which persists in asserting itself.

Method of Clinical Use

The nature of these unconscious forces can only be explored by processes designed to circumvent, as it were, the so-called "censor," the repressing force. With this object the psycho-analytic method was evolved, for clinical purposes. Convinced that many hysteric, neurotic, and neurasthenic ailments, great and small, result from the repression of unpleasant desires, images, or experiences, and especially in early childhood, psycho-analysts seek to discover the nature of these repressions. A group of such repressed ideas is technically known as a "complex," and analysis is directed towards bringing the complex out into the conscious mind, so that the subject may clearly realize the real cause of his trouble.

The dream has been carefully studied by psycho-analysts. They hold that the dream is a direct manifestation of the unconscious mind, and that systematic examination of the features of dreams gives the analyst his best approach into that difficult region. According to Freud, the function of the dream is to protect the physiological process of sleep from unconscious psychic disturbance, by giving the mind a fulfilment of its repressed or unattained desires. The "censor" works to disguise the inner and real meaning of the dream by symbolism, the workings of the unconscious being translated into terms of the conscious mind, and this process makes the "latent content" of a dream unrecognizable to the dreamer.

Through examination of dreams and translation of their symbolic expression the analyst can often

discover repressed or "forgotten" ideas, images, etc., of which the subject has not any "consciousness." Similar results are disclosed by the analysis of day-dreams, fantasies, and hallucinations, and some psycho-analysts have used their method to investigate the inner meaning of works of art, pictures, poems, etc.

The technique of psycho-analysis is based on the free association of ideas. Its success depends largely on a sympathetic *rapprochement* between analyst and patient. Careful questioning is carried on, often upon the details of a dream, or on the observed reactions of the patient to a scheme of word-association whereby he is invited to name, freely, and without regard to apparent sense or connexion, the idea called up by certain chosen words. Except in the hands of properly equipped practitioners, the psycho-analytic method should not be experimented with.

Cause of Neurotic Troubles

Freud's researches in abnormal psychology went to show that the forced repression of sexual instincts was the commonest cause of neurotic disturbances; and he and his school have tended to give sex the paramount place among human motives. Much misrepresentation of the Freudian sexual theory has been caused by misunderstanding of it. The sexual instinct as conceived by Freud is far wider in scope than as understood in ordinary parlance, and does not justify the accusation that psycho-analytic doctrine is necessarily degrading to one's valuation of humanity.

Carl Gustav Jung, of Zürich, has made important developments. Dissatisfied with Freud's interpretation of dreams in materialist terms, he prefers to regard them as aspirations of the unconscious self towards the future. Much important criticism has been directed against the so-called determinist character of the doctrine, its assumption that human conduct is infallibly ruled by a series of previous actions or thoughts. But, despite the self-damaging zeal of certain enthusiasts, the general principles of psycho-analysis will probably have considerable influence on psychological research, and on the practice of psychotherapy and education. See Dream; Freud; consult also The Works of S. Freud; Psycho-analysis, A. A. Brill, 1914; Studies in Word Association, C. G. Jung, 1918; Psycho-analysis, Barbara Low, 1920; Elements of Practical Psycho-analysis, P. Bousfield, 1920.

PSYCHOLOGY: THE SCIENCE OF MIND

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Kindred articles are those on Metaphysics and Mind. See also Intelligence Tests; Memory; Perception; Suggestion; Will

The inquirer into psychology is faced by a preliminary obstacle hardly to be met elsewhere: namely, that the professors are seriously at odds even about the object of their science. Speaking broadly, they fall into two schools.

The older school have their domestic differences, but agree in regarding psychology as the science of mental phenomena, meaning by that term sensations, emotions, memories, thoughts, acts of will and the like. Moreover, they are in general agreement about the way in which mental phenomena should be studied. Sensations, feelings, etc., are private property which no one but their possessor can observe; no one else can know how a colour appears to me, what mental picture I have before my mind's eye, what precise degree of agony a bad tooth is causing me. We often make inferences about another's experience—as when we judge from his expression that he is angry—but the experience itself is accessible only to its owner. Thus there is, ultimately, only one method of inquiry in psychology, the method of introspection, or of looking into one's mind to see what is there.

The younger school both disclaim the object and reject the method of the older psychologists. A science, they argue, cannot be based on private knowledge; it must deal with facts open to all competent observers. Hence psychology, if it is to be counted a science, must change its ways and model itself anew upon physiology. Just as physiology seeks to determine how particular organs behave under given conditions, so psychology should interest itself in the behaviour of the individual as a whole when he is brought into carefully stated situations. This does not rule out self-observation altogether, but it does rule out all observation of my own behaviour which another could not make.

Results of Introspective Psychology

In spite of the "behaviourists," it must be admitted that introspective psychology has obtained results of permanent value. To begin with, there is the law that every mental occurrence has three aspects, technically known as cognitive, affective, and conative. To take a simple instance: I catch sight of a colour (cognition), am pleased or displeased by it (affect), and adjust myself to see it better or to avoid its sight (conation).

Under cognition the chief distinctions are between sensations, percepts, images, and thoughts or ideas. Sensations are immediately caused by the stimulation of particular nerve-ends or "receptors." Sensations of light, sound, temperature, touch, taste, smell are familiar instances; less obvious are the "kinaesthetic" sensations which keep us aware of the posture and movements of the limbs. The study of all these has been carried to a high degree of refinement.

Sensation and Perception

Sensation is, however, hardly to be called cognition; it is rather the gateway by which we reach actual knowledge of the external world. A certain prolonged sound falls on my ears, and I say "A tram is coming," or a certain group of light and colour sensations prompts the remark, "There is my pipe." This passage of the mind from sensations to the external objects they announce is called perception. It has been aptly compared with what happens in reading, when the mind passes by way of the printed characters to the message they deliver. Like reading, perception depends on accumulated experience; a baby would hear only a noise, he would not hear the tram-car. By perception we gradually build up our vision of the outside world as consisting of distinct objects.

Anything once perceived may come before the mind again as a mental image. I may, for example, have a visual image of an absent friend, an auditory image of a familiar tune, an olfactory image of the smell of violets, etc. Adults differ widely in the kind and amount of their imagery; abstract thinkers, for instance, were found by Galton to be notably deficient in visual images. Verbal imagery—that is, recall of the appearance or sound of words, or of the movement made in pronouncing them—is, however, rarely if ever absent from such processes as silent writing or thinking; as may be verified by writing a few sentences and noting the "inner speech" which accompanies the movements of the pen.

Thinking may be defined broadly as the mind's activity when engaged with absent things or with "concepts"—i.e. the meanings or "patterns" which it has found in and abstracted from its experience. It includes remembering, association (when one thing "brings up" another), imagination, and reason-

ing. Imagery, sensual or verbal, plays in these processes a part similar to the rôle of sensations in perception; it is a controverted question whether imageless thought can ever occur.

Under affects we must distinguish between (1) physical pain and pleasure, (2) "feeling-tone," and (3) emotions. Physical pain (e.g. the pain of a burn) is now known to be a sensation caused by stimulation of definite nerve-ends; the same thing is probably true of certain physical pleasures. Feeling-tone is the varying current of pleasantness or unpleasantness which accompanies all experience. Its distinctness from physical pain and pleasure is illustrated by the observation that a pain, if not too severe, is often rather pleasant. The nature of emotions, such as fear, anger, joy, etc., has been much disputed. According to the famous James-Lange theory, they are simply strongly toned sensations. We do not cry or strike, says James, because we are sorry or angry; we are sorry or angry because we cry or strike—i.e. the emotions are simply feelings, strongly pleasant or unpleasant, which arise from the physiological activities and movements of the body. Most psychologists hold, however, that well-defined emotions (e.g. fear and anger) contain affective elements not to be accounted for in this way.

Conation and Biology

By conation psychologists mean the element of striving which occurs everywhere in conscious life. It is best seen in interest and sustained attention, in desire, purpose, and will, but is present equally in the simplest mental acts. Under the influence of biology conation has come to take the central place in the psychological scheme. Man, like the lower creatures, is thought of as essentially a "behaving animal," his life as a series of purposive reactions to his environment; percepts and ideas are then regarded as signals which release or control those reactions, emotions as the sources from which they are energised or inhibited.

The biological trend in recent psychology is well illustrated by Prof. W. McDougall's work. Upon his view human behaviour, however complex it may become, is actually developed along a few main lines which are marked out by the instincts man has inherited from his animal ancestors. The central element in each instinct is a specific emotion (e.g. fear) which is awakened by a specific kind of object (e.g. a beast of prey) and

energises a specific kind of active response (e.g. flight). The character of the emotion is practically permanent, but the objects which stimulate it and the actions to which it leads may vary enormously from the simple types we see in the animal world. For example, the object feared may be an infectious disease, and the defensive action an elaborate process of inoculation. There is in man a further tendency of the instincts to yield complex systems of emotions and desires having permanent and often ideal objects. These systems are described by A. F. Shand as sentiments. A man's own self, his family, his business, his country, are instances of objects towards which sentiments are developed, and the nature of his emotional reactions towards them largely determines what we call his character.

Hypnotism and Personality

The simple observation that we are, at a given moment, conscious only of a minute fraction of the memories we carry in our minds suggested long ago the idea that there are unconscious mental phenomena. The study of hypnotism and of "alternating personality" has done much to increase the significance of this idea, while the discoveries of Freud and his followers have shown that the influences of the unconscious layers of the mind constantly affect our behaviour, often in the most important way. The results of Freud's work are, indeed, likely to have epoch-making significance in medicine, criminology, and education.

"Behaviourism" has grown partly out of experimental human psychology, partly out of animal psychology. A typical experiment in human psychology is to exhibit to a person a signal (e.g. a word), and to measure the time he takes to respond to it by a prearranged act, e.g. pressing an electric key. A typical investigation in animal psychology is to put a hungry rat repeatedly into a maze and to observe how he learns to take the direct route to the food placed at the exit. In both cases the psychologist is not the agent who experiences the activity, but a bystander who arranges the experiment and records what happens. The rapid growth of interest in behaviourism is largely due to the fact that many highly promising applications of psychology depend upon observations essentially of this kind. For example, tests of general ability and of fitness for special vocations, inquiries into industrial fatigue, and the best

ways of carrying out skilled operations may all be regarded as applications of the method of behaviourist psychology.

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Psychoneurosis. Mental disorder, the result of a chain of abnormal psychological processes. See Hysteria; Neurasthenia; Neurosis.

Psychophysics (Gr. *psychē*, soul, mind; *physika*, physics). Term invented by the German philosopher Fechner, and defined by him as an exact theory of the relations between mind and body, and, generally speaking, the relations between the psychical and physical worlds. According to Wundt, it consists in the investigation of the relations that can be shown empirically to exist between the psychical and physical aspects of vital processes. The object is to discover these relations; beyond that its interest ceases. Psychology, on the other hand, examines these relations from the point of view of the mind; physiology, from the point of view of the body.

Psychosis. Disorder of the mind, not due to recognizable psychological processes as are the neuroses and psychoneuroses. The term is practically equivalent to insanity (q.v.).

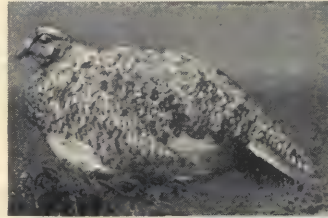
Psychotherapy (Gr. *psychē*, soul; *therapeia*, treatment). Treatment of mental disorders by influencing the mind. Usually employed for the treatment of hysteria, neurasthenia, and kindred affections, it embraces treatment by suggestion, hypnotism, psychoanalysis, and various forms of re-education where function has been impaired without organic disease.

Psychrometer (Gr. *psychros*, cold; *metron*, measure). Name given to a wet and dry bulb thermometer. It consists of two thermometers, one with a bulb exposed to the air, and the other with the bulb covered with muslin kept wet with water. The first gives the direct air temperature; the second

a lower temperature due to the evaporation of the water. The drier the atmosphere the more rapid the evaporation, and the greater the difference of temperatures recorded by the two thermometers, so enabling the amount of moisture in the atmosphere to be calculated.

Ptah. Egyptian deity. The local god of Memphis in the 1st dynasty, he was the divine artificer, creating all things out of the Nile mud. Assimilated to other gods—Osiris, Apis, Sokar—he is represented with a mummified body, wearing a skull-cap. In later times, as a bandy-legged dwarf, he resembled the Greek Hephaestus. See Egypt.

Ptarmigan (Gaelic *tarmachan*). Species of grouse (*Lagopus mutus*), found in the mountainous districts of N. Europe. In summer the plumage is brownish grey marked with black lines and dark spots, and



Ptarmigan. Species of grouse found in the Scottish highlands. Top, left, hen bird; below, cock

W. S. Berridge, F.R.S.

in winter it is white with the exception of a small scarlet comb, a black line on each side of the head, and black outer tail feathers. It is the only British bird that thus changes its plumage for protective purposes. It is 14 ins. long, and the legs and feet are thickly feathered. In Great Britain it is restricted to the highest parts of the Scottish highlands and to some of the western islands. Both in summer and winter it so closely resembles its surroundings that it is difficult to detect until it takes flight. In the nesting season the hen sits so close that she may be approached without difficulty, and when the young are about, the hen will endeavour to draw off an intruder by running

near him with a trailing wing as if wounded. The ptarmigans seen in the markets are mainly willow grouse imported from Scandinavia. See Bird; Grouse.

Pteridophyta (Gr. *ptēris*, fern; *phyton*, plant). Botanical group which includes the ordinary ferns, the water ferns (Marsileaceae), the club mosses (Lycopodiaceae and Selaginellaceae), and the horsetails (Equisetaceae). Anatomically the pteridophyta are more complex than the mosses; the specialisation of tissues for distinct functions has reached a higher stage of efficiency. In the same way as the mosses they exhibit a regular alternation of generations, but with a difference. The fern-plant produces spores and is the asexual generation; from the spore is produced a small green body, not as a rule exceeding an eighth of an inch in length, known as the prothallus, and this bears the male and female organs. From the fertilised egg the new fern-plant arises. It is therefore the fern-prothallus which corresponds to the moss-plant. In some pteridophytes, e.g. in *Selaginella*, two kinds of spore are produced, larger (megaspores) and smaller (microspores); each spore on germination forms a prothallus. The prothallus developed in the megaspores bears female organs, while the microspore furnishes the male gametes. See Fern.

Pteris (Gr., fern). Genus of ferns of the natural order Polypodiaceae. Natives of all regions, they have usually creeping rootstocks. The leaves or fronds are of very varied form, from the simple undivided arrow-shaped leaf of *P. sagittifolia* (S. America) to the three or four times divided one of *P. aquilina*, the bracken. The distinguishing feature is the massing of the spore-capsules in a continuous line around the margin of the frond or its divisions. Many of the species are in cultivation as ornamental plants.



Pteris. Arrow-shaped leaves of *P. sagittifolia*. Inset, left, leaf bud; right, spore-capsules

Pterobranchia (Gr., wing-gilled). Small group of minute organisms dredged from the depths of the ocean. They were formerly supposed to be polyzoa, but are now regarded as hemichorda (*q.v.*).

Pterodactyl (Gr. *pteron*, wing; *daktylos*, finger). Name given to the flying lizard, the fossil remains of which are found in rocks of mesozoic age. Varying in size from only a foot in the spread of their wings up to some 20 ft., these reptiles were remarkable for their bird-like habits. The wings, however, resembled more those of the present-day bat, being a membrane attached to the body and the long, jointed fingers of the fore limbs. The hind legs of the pterodactyls bore a strong resemblance to those of reptiles, but the heads of many were more bird-like, possessing jaws covered with a horny beak. In some members the jaws were provided with strong conical teeth. The bones were



Pterodactyl. Skeleton of *P. spectabilis*, a short-tailed flying reptile

By courtesy of the trustees of the British Museum

hollow, in this respect resembling birds, the skulls pointed, the eyes large, and in some of the earlier forms the tail was very long and slender. The majority were incapable of long-sustained flight. Remains of the reptile have been found in England, Europe, and N. America. See Lizard.

Pteropoda (Gr. *pteron*, wing; *pous*, foot). Group of marine molluscs. They were formerly ranked as a separate order, but are now usually included in the Gastropoda (*q.v.*). The foot has been modified into a pair of wing-like processes, by the aid of which the animal swims. Hence they are popularly called sea butterflies. Some of them bear small, transparent, glassy shells, and some species form the chief food of the



Pterobranchia. *Cephalodiscus dodecalophus*, from the Straits of Magellan. A. Colony. B. Highly magnified individual specimen, indicated by a in A

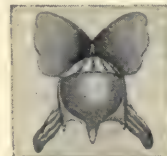
baleen whales. The majority are tropical. See Mollusca.

Pterosauria (Gr. *pteron*, wing; *sauros*, lizard). Name given to extinct flying reptiles that are known also as Ornithosauria and Pterodactyls (*q.v.*).

P.T.O. Abbrev. for please turn over.

Ptolemaic System. Theory expounded by Ptolemy to account for the movements of heavenly bodies. He supposed that the moon, sun, and stars revolved in circles about the earth. Beyond the latter, and beyond the fire and water which it supported, was the ether. The zones of the heavens were in and beyond the ether, each zone a transparent spherical shell. Each shell or sphere had its own heavenly body which, revolving with it, moved round the earth.

The innermost sphere was that of the moon, and the others in order were those of Mercury, Venus, the sun, Mars, and Jupiter, with Saturn and the fixed stars sharing the eighth outer sphere. Afterwards a ninth sphere was added to explain the slow movement of the precession of the equinoxes, and beyond that a tenth sphere to account for day and night. The tenth sphere or *primum*



Pteropoda, shell-bearing *Cavolinia tridentata*

mobile therefore revolved from E. to W. in twenty-four hours and carried along with it all the inner spheres. The apparent progression and regression of planets were accounted for on the supposition that each moved in a circle on its own sphere, while the latter moved round the earth. The theory dominated all astronomical thought till the time of Copernicus (*q.v.*). See Astronomy.

Ptolemais OR ACE. Ancient city of Phoenicia. Lying S. of Tyre, it is now known as Acre (*q.v.*)

Ptolemy OR CLAUDIUS PTOLEMAEUS (*fl.* A.D. 127–51). Egyptian astronomer and geographer. The dates of his birth and death are unknown, all that is certain being that he conducted his observations in Alexandria during the reigns of Hadrian and Antoninus Pius.

Ptolemy was one of the most eminent scientific men of the ancient world. He not only coordinated the scientific knowledge of his time but added to it results of his own which have stood to the present day. His doctrines were incorporated in his great work in 13 volumes, called by the Arabs the *Almagest* (*q.v.*).

In what must be regarded as one of the greatest works of the ancients, Ptolemy treats of the positions and motions of the earth, moon, sun, and stars, and makes and proves the statement that the earth is a sphere. His work contains theorems and problems in trigonometry and geometry which are of fundamental importance, the length of the year, a catalogue of stars of the N. hemisphere, motions of the planets, etc.

As a geographer, Ptolemy was as celebrated as he was as an astronomer and mathematician. His *Geographikē Syntaxis* dominated its own particular sphere as his *Almagest* did astronomy, and Ptolemy's concept of the world held till the 15th century. It was the first attempt to place geography on a scientific basis. He laid down the latitude and longitude of places and constructed maps of the known inhabited world on a mathematical basis far in advance of his time. See *Astronomy*; *Map*; *Ptolemaic System*. Consult also *Works*, ed. J. L. Heiberg, 1895–1907; *Geographia*, ed. C. F. A. Nobbe, 1842–45; *Classical Ptolemy and the Nile*, W. D. Cooley, 1854; *Ancient India described by Ptolemy*, J. W. McCrindle, 1885; *The Geography of Ptolemy Elucidated*, T. G. Ryland, 1893.

Ptolemy I Soter (367–283 B.C.). King of Egypt. He was one of the favourite generals of Alexander the Great, at whose death in 323 he became satrap of Egypt, and in 305 assumed the kingly title, thus inaugurating the Ptolemaic dynasty, which lasted until 30 B.C. After his father he was called Ptolemy Lagi. The aid sent in 304 to Rhodes, when

besieged by Demetrius Poliorcetes, earned for him the name Soter (Gr., saviour). Soter founded Ptolemais in Upper Egypt, as a rival to Thebes, undertook many overseas adventures, and twice occupied Jerusalem. He fostered the commercial and intellectual interests of his capital at Alexandria, built the Serapeum, and planned the famous library and museum, where under his auspices Euclid taught mathematics. In 285 he abdicated, and died two years later.

Ptolemy II Philadelphus (308–246 B.C.) King of Egypt. Born in Cos, a younger son of



Ptolemy II Philadelphus, King of Egypt
From a bronze bust

Berenice, he succeeded on his father Soter's abdication in 285. Establishing sea-command in the Mediterranean, he annexed Coele-Syria and Phoenicia, and fostered trade with Somaliland. He opened a canal from the Nile to the Red Sea, and founded in his mother's honour the port of Berenice. He maintained diplomatic relations with the Indian emperor Asoka, completed the lighthouse on the Pharos islet at Alexandria, and built the great pylon at Philae.

His first wife, Arsinoë I, daughter of Lysimachus of Thrace, was banished in favour of his own sister, Lysimachus' widow, Arsinoë II. He wedded her, and, at her death in 270, deified her as Philadelphus (Gr., loving a brother or sister), a title afterwards attached to himself also. In her honour he reclaimed land in the Fayum, calling it the Arsinoite nome.

Ptolemy III Euergetes (281–221 B.C.). King of Egypt. Elder son of Arsinoë I, he succeeded his



Ptolemy III Euergetes, King of Egypt
From a coin

father Philadelphus in 246, and by marrying Berenice, daughter of Ptolemy Soter's stepson Magas, added Cyrenaica to Egypt. He overran the Seleucian kingdom to Babylon and Susa, bringing back many Egyptian deities carried away by Cambyses. Hence he and his consort were deified with the title Euergetae (Gr., benefactors), and the decree of Canopus (*q.v.*) was promulgated in their honour.

During his reign Ptolemaic seapower reached its acme. The splendid Edfu temple and a pylon at Karnak (*q.v.*) were founded by him. See *Eratosthenes*.

Ptolemy V Epiphanes (209–181 B.C.). King of Egypt. Succeeding his father Ptolemy IV



Ptolemy V Epiphanes, King of Egypt
From a coin

Philopator in 205, under guardians, his minority was marked by the invasion of Egypt's overseas possessions by Antiochus the Great and Philip V of Macedonia. The intervention of Rome confirmed to the Seleucid king Coele-Syria and Phoenicia. Epiphanes (Gr., illustrious) was declared of age in 197. He wedded a daughter of Antiochus, Cleopatra I, who brought as a dowry the revenues of Coele-Syria and Palestine. The financial measures associated with a projected Syrian campaign led to his death by poisoning. See *Rosetta Stone*.

Ptolemy VI Philometor (186–145 B.C.). King of Egypt. Son of Cleopatra I, he succeeded his



Ptolemy VI Philometor, King of Egypt
From a bronze bust

father Epiphanes in 181, under his mother's regency until her death about 173. The invasion of Egypt by Antiochus IV Epiphanes, and the capture of Philometor at Memphis, are referred to in Dan. 11. His younger brother, nicknamed Physcon (Gr., obese), was proclaimed king in 170, and for the rest of the reign there was intermittent rivalry between them, each being supported in turn by Rome. Shortly after being proclaimed king of Syria, Philometor fell in battle near Antioch.

Ptolemy X Soter II (d. 80 B.C.). King of Egypt. Son of Cleopatra III, he succeeded his father Physcon at his death in 116. He was formerly ranked as Ptolemy VIII, but as two other Ptolemies, Eupator and Neos Philopator—who were perhaps both sons of Philometor—reigned between Epiphanes and



Ptolemy X Soter II, King of Egypt
From a bronze bust

Physcon, Lathyrus, or Soter II, now usually ranks as X. His mother was co-regent until in 110 he exercised sole authority, but three years after was banished in favour of his younger brother, Ptolemy XI, or Alexander I. He in his turn was deposed in 88, and Lathyrus, recalled from Cyprus, reigned a second time until his death.

Ptolemy XIII Auletes (95–51 B.C.). King of Egypt. On the assassination of Ptolemy XII (Alexander II) in 80 the legitimate line ended. The throne was offered to a natural son of Lathyrus, nicknamed Auletes (Gr., flute-player), from his proficiency with that instrument. He married Cleopatra V, and on her death about 69 fled to Rome, his daughter Berenice IV being put in his stead. Rome reduced Cyrenaica to a Roman province and confiscated Cyprus, but acknowledged Auletes as legitimate sovereign of Egypt, on payment of a tribute of 6,000 talents. Auletes greatly embellished Philae.

Ptolemy XIV Philopator (61–47 B.C.). King of Egypt. On the death of Auletes in 51 his eldest son, Philopator, and his daughter, Cleopatra, ascended the throne jointly, under the guardianship of the Roman senate. In their fourth year the queen was banished, and raised an army in Syria, but without avail. After his defeat at Pharsalia Pompey sought refuge in Egypt, but was slain at Ptolemy's instigation. On Julius Caesar's arrival at Alexandria Cleopatra's cause was espoused by him. In 47 Ptolemy was drowned after a battle on the Nile, and his sister was reinstated, with their younger brother, Ptolemy XV, as co-regent. See Cleopatra; consult also *The Empire of the Ptolemies*, 1895; *History of Egypt under the Ptolemaic Dynasty*, 1899, J. P. Mahaffy; *History of Egypt*, E. A. T. Wallis Budge, 1902.

Ptomaine (Gr. *ptōma*, corpse). Alkaloidal substance formed in the process of putrefaction of nitrogenous organic tissues. Such have been regarded as responsible for the symptoms in cases of poisoning by meat, but it is now known that many, if not all, such cases are due to the meat having become infected with disease-producing micro-organisms. See Meat.

Ptoxis (Gr. *ptōsis* from *ptiein*, to fall). Inability to raise the upper eyelid. It may be congenital, or due to injury or disease, producing paralysis of the nerve which supplies the eyelid, locomotor ataxia being the most common. Rheumatism may cause ptoxis, and in some cases the condition is a manifestation of hysteria. See Eye.

Ptyalin (Gr. *ptyalon*, saliva). Enzyme in the saliva. Secreted by the salivary glands, it acts on starch, splitting it into the simpler substances, dextrin and maltose.

Puberty (Lat. *puber*, mature). Age at which the reproductive organs become functionally active. In boys, in temperate regions, changes characteristic of puberty generally appear between the 14th and 16th years. The rate of growth is increased, the frame and general build begins to approach that of the man, hair appears in the pubic region, the tones of the voice become deeper, and for a time some slight want of control over the pitch of the voice gives rise to the occasional squeakiness known as "breaking" of the voice. In girls, puberty generally occurs between the ages of 13 and 15. The figure fills out, the breasts become enlarged and rounded, and the menstrual function is established. In hot countries puberty tends to occur at an earlier age than in cold climates.

Publican (Lat. *publicanus*). In ancient Rome, a contractor for public business, but more especially for the collection of taxes. The tax-farmer paid the state a certain sum and found his remuneration in what excess revenue he could collect, a vicious system, which inevitably

caused injustice and oppression. In practice, owing to the heavy financial responsibility involved, publicans formed themselves into syndicates to carry out any particular contract. The farming of taxes was for long a coveted privilege of the equestrian order at Rome, which was chiefly composed of capitalists and men of business. The actual work of collecting the taxes was done by slaves, freedmen, and other people of humble rank. See Equites; Licensing Laws.

Public Defender. Suggested legal official corresponding to the public prosecutor. It has long been recognized that some definite legal machinery is required to enable poor persons to obtain proper legal assistance to defend themselves on any particular charge. Several attempts have been made along such lines, e.g. the Poor Prisoners' Defence Act, 1903, which entitles any poor person committed for trial on charge of an indictable offence to have solicitor and counsel assigned to him for his defence on a certificate of justices committing him for trial or of the judge or quarter sessions chairman. Many efforts have been made to provide a public defender on the lines of the public prosecutor, and a bill was introduced into Parliament in 1919.

PUBLIC HEALTH AND ITS PROBLEMS

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See on this subject the articles *Infant Mortality; Sanitation; also Birth Rate; Death Rate; and those on Cancer; Tuberculosis, and other diseases*

Public Health relates more particularly to the collective physical health of the community. The general hygiene which it connotes is directed towards the elimination or amelioration of unfavourable conditions affecting the health of the public at large, and thus to the increase of health and the prolongation of life. Its instruments are the machinery of education and the powers and provisions of organized authority for safeguarding the health interests of the community, where ignorance, indifference, or avarice run counter to them. The various public health provisions that are made for the common good, necessary and valuable though they are, cannot in themselves secure a high level of public health, for this is in great measure dependent on the hygienic concern and habits of the people in the intimate circumstances of their living. Popular education and training in such matters are of essential importance. Public health, however, does not solely relate to physical well-being; it is intimately con-

cerned with broader issues; and in its application it seeks to influence morals and economic conditions. Thus all measures that are calculated to raise the standard of social well-being, physically and morally, fall within the realm of public health—the ultimate aim being to secure in the greatest possible number the healthy mind in the healthy body. The aim of preventive medicine is to make human knowledge of all preventable disease as complete as possible, and to apply this knowledge to the best advantage. It seeks to prevent or remove all those circumstances which cause or favour the appearance and propagation of disease; and to increase the individual power of resistance.

The prevention of disease increases the sum of human happiness and efficiency; for disease is not an eliminator of the unfit only; it destroys indiscriminately. To this end the preventive and curative sides of medicine, which are naturally correlated, should be more closely linked up. The

public health possibilities of general medical services working more on hygienic and preventive lines, are almost incalculable; for it is the general practitioner who, with his first-hand knowledge of the needs of the individual, is at grips with the essential problems of preventive medicine.

Hygiene, or the art of preserving health, has been taught and practised since before the time of Hippocrates, a great teacher of the subject so far as empiricism could advance it; but it did not acquire a scientific basis until the knowledge of the laws of life (physiology) began to be studied, in the light of which the causes of disease could be discovered and prevented. Sydenham's observations upon the natural history of infectious disease (1661-76) disclosed facts which stimulated the study of epidemiology long before the agents directly responsible for infection were known.

The doctrine that infection spread by minute parasitic organisms of a specific nature was first philosophically maintained by Fracastoro in the 16th century, but Pasteur's discoveries (1856-64) made possible the bacteriological science of to-day that has done so much for public health. While the period 1760-1800 saw the beginning of the scientific foundation of public health effort in Great Britain, and the development of public concern in this connexion, a real organization of public services came much later, and not until 1847 was the first public health official, Dr. Duncan of Liverpool, appointed.

Increased Public Knowledge

In the earlier days of organized public health endeavour, the central and local health authorities concerned themselves with the abatement of gross insanitary conditions and with efforts to prevent the spread of certain specific diseases, which were regarded as more particularly affecting the health of the community. With a broadening outlook an increasing regard came to be paid to the individual. This was first manifested in the growing provisions for the care and treatment of the sick; and the consideration for environment, which had hitherto been judged to be the main issue, now takes second place to that which relates directly to the individual. The public health can never be satisfactory while there is ignorance and indifference to the simple laws of healthy living, whatever the environment may be, and so increasing efforts were made in order to educate the public in these matters.

The cult of the individual now finds expression in countless useful provisions for guarding his health, amongst which the public care of the expectant and nursing mother and infant, the medical inspection of school children, and national health insurance, may be mentioned as of special importance. The growing recognition of the relationship between health and industrial efficiency and poverty has done much to bring about the extension of public health endeavour and provisions; and public health work now requisitions a personnel which administers to the sick, protects from disabilities and incapacities, and regulates personal and industrial hygiene.

Reduction of Infant Mortality

In more recent years an increasing effort has been made to reduce infant mortality, which had not hitherto shared in the marked reduction in the general death-rate. It had long been evident that this heavy loss of infant life annually recurring was largely the result of parental ignorance, and so a movement was initiated to provide advice and encouragement, and assistance when this is required. It was soon seen that the local infantile mortality rates were responding to these efforts; and in 1907 the Notification of Births Act, by requiring the notification of all births to a medical officer of health within 36 hours, made it possible greatly to extend the value of this work. Stimulated by these results and by government grants in aid of it, infant and ante-natal clinics, child welfare centres, and many related activities, grew rapidly; and the work of child welfare, formerly confined to the first year of life, was carried up to the fifth, the age of compulsory school attendance.

A large number of public health measures have been passed by Parliament, and the increasing powers and the growing provisions for administering these powers reflect the ever-widening domain which it is sought to cover in the interests of the public health. The legislation relating to child-birth, infancy, and childhood, the school child, those industrially employed in factories and workshops, housing, national health insurance, and communicable disease, is bearing good results, and is pregnant with greater possibilities for the future; and the measures put in operation against tuberculosis (1912) and venereal disease (1916) are an expression of the determination to make a direct attack upon these diseases, two of the greatest enemies of public health.

Bacteriology has made great advances in recent years, and with the knowledge of the causal agents of infection, the prevention and cure of communicable disease have gained considerably. Especially is this true in reference to the bacteriological diagnosis of cases of disease which cannot be diagnosed with certainty by clinical methods, to the discovery of preventive inoculations to confer temporary immunity from attack, and of curative inoculations to reduce mortality. By the use of ever-improving methods and provisions for the early diagnosis and the prompt notification of communicable disease, and by providing for the isolation or quarantine of sufferers, and for the necessary disinfection, most forms of communicable disease are coming more under control. Although there remain some, such as measles, whooping-cough, influenza, and infectious pneumonia, which continue to resist the efforts to prevent their spread, provisions for reducing the mortality therefrom are meeting with encouraging success. The frequent occurrence of obscure infection in carriers, and mild, and therefore often unrecognized, cases, with no suspicious symptoms, are now known to be a source of infection of diphtheria, cerebro-spinal fever, enteric fever, dysentery, influenza, etc.

Work of Public Authorities

In England the local government board was the central controlling department in most matters of public health until 1919, when the ministry of health was established, more particularly to bring under one central body the public health powers which had previously been exercised by several departments. The public health administrative authorities embrace county councils, county borough councils, borough councils, urban and rural district councils; and the public health service of local authorities includes a legal and clerical staff, an engineering and surveying staff, and a sanitary staff under the direction of the M.O.H.

A study of the vital statistics of England and Wales for the past 50 years, and of the earlier life-tables, furnishes evidence of the improvement which has taken place in the public health. More than a quarter of a million lives are now saved each year which would have been lost 50 years ago, and over 60 p.c. of the lives saved are in respect of communicable disease; and the life-tables demonstrate that the expectation of life of males, which during 1834-54 was 39.91 years, has progressively

increased to about 44½ years at the present time. In default of a general sickness rate for the community, the best statistical evidence of the public health is the death-rate, and the mean annual death-rate of England and Wales for the following 10-yearly periods has shown the following progressive decrease: 1861-70, 22·5 per 1,000; 1871-80, 21·4; 1881-90, 19·1; 1891-1900, 18·2; 1901-10, 15·4. The improvements in sanitary circumstances are closely reflected in the death-rates from phthisis, enteric fever, and infantile diarrhoea. The death-rates from phthisis and diarrhoea are now less than half of what they were about 1870, and that for enteric fever is only about one-eighth.

The rates of infant mortality furnish no evidence of any continuous reduction before 1905, but the mean rate since the commencement of that year and up to the last pre-war year (1913), was 116; while that for a corresponding number of years immediately preceding 1905 was about 146.

Special mention may be made of some further achievements of public health work during recent years. In industrial hygiene the measures taken to guard against the inhalation of trade dusts or vapours, which if long continued tends to produce diseases of the lungs and predispose to fibroid phthisis, have met with great success.

Industrial poisonings have shrunk even more; lead poisoning has been reduced some 50 p.c., phosphorus poisoning may be said to have almost ceased, and mercurial, arsenical, and copper poisonings are a small fraction only of what they once were. Of epizootic diseases, rabies, glanders, and anthrax, notably, are claiming far fewer victims than formerly; and of tropical diseases mention must be made of the success of the regulations designed to prevent the importation of cholera, yellow fever, and plague into Great Britain, and of the great triumphs in the prevention of malaria, yellow fever, and Malta or Mediterranean fever.

Moreover, the recent increase of knowledge of diseases arising from the deficiency or absence of certain diet constituents, promises increasingly great results in the prevention of such diseases as beri-beri, scurvy, and rickets. On the other hand, despite public health efforts, there has been some increase in the deaths attributed to cancer, diabetes, and diseases which affect the heart and blood-vessels. See Hygiene and Public Health, L. C. Parkes and H. R. Kenwood, 6th ed. 1917.

Public Health. ROYAL INSTITUTE OF. British institute founded in 1886 to promote the interests of those engaged in official public health work at home or abroad, or in the public services, and to assist in the investigation and study of all branches of public health. The institute has well-equipped chemical and bacteriological laboratories for the purpose of study and research. Investigations are undertaken for municipal and other bodies and medical practitioners. Courses of lectures are given on tuberculosis, military hygiene, and domestic hygiene. The address of the institute is 37, Russell Square, London, W.C.

Public House. Licensed house where alcoholic liquors are provided for retail sale and consumption within specified hours. See Beer-house; Inn; Licensing Laws.

Public House Trust. British organization having for its object the promotion of temperance by supplying food and drink under conditions that do not encourage the sale of alcoholic liquor. The movement was initiated about 1905, the chief promoters being Earl Grey and Bishop Jayne. The central association is at 193, Regent Street, W., and there were in 1921 17 trust companies in the U.K., of which 12 were in England. More than 300 houses were then under trust management. The system provides that the managers shall have a fixed salary, and no interest in selling alcoholic liquor, their profits coming from the sale of food and other drinks, e.g. tea, coffee, mineral waters, etc.

Publicity. Term used as an extension of advertising. In recent years it has become usual for all great business undertakings to employ men to make their work known in every possible way. Publicity thus includes, in addition to newspaper advertising, the preparation of booklets and other literature, the display of posters, the entertaining of influential persons, and anything else that may serve the end in view. During the Great War several Government departments had directors of publicity, who were especially prominent in attracting recruits to the army, and in organizing campaigns for raising loans. The ministry of food had also a director of publicity. See Advertising.

Public Policy. Comprehensive legal term for the overwhelming interest of the country as a whole. In English law, a contract which is immoral, or in unreasonable restraint of trade, or of a fraudulent or criminal character, is said

to be against public policy, and is unenforceable. The courts will not lightly hold a contract to be void on this ground. The chief classes of contracts attacked by the doctrine are contracts not to trade, or not to work, and for this reason all trade unions, whether of masters or men, cannot enforce at law the contracts entered into between them and their members.

Public Prosecutor. In England, a high legal official, whose duty it is to undertake, on behalf of the government, the prosecution of persons charged with serious crimes. All cases of treason are prosecuted by him, and many other cases of great gravity. He has the right to interfere at any stage of the preliminary proceedings in a criminal case, and to take the prosecution out of the hands of the local police or of a private prosecutor. Anyone who charges another with the commission of a serious crime may send information to the public prosecutor, to take action if thought desirable. When a judge, in the course of a civil trial, discovers that someone has apparently committed a crime, he frequently orders the papers in the case to be sent to the public prosecutor. His office is in Whitehall, London, S.W.

Public School. Name given in the United Kingdom and elsewhere to a certain type of school. Definitions vary. In one sense public schools are the antithesis of private schools, as they are controlled by a board of governors or other authority, and are not private property. In another sense public schools are those maintained by public funds, and thus all the elementary and secondary schools under the board of education and the various local authorities are public schools. The term is often confined to schools for boys, but to-day schools for girls are equally public schools, whatever test be applied.

The most general use of this term, however, is for certain large schools for boys run on what are called public school lines. These include the prefectural or monitorial system, i.e. participation by senior boys in the maintenance of discipline, the arrangement of the pupils in forms, their division into houses partly for the sake of competition, and a good deal of attention to sport. Another feature was the predominance of the classics in the curriculum, and although modern subjects have been introduced, the public schools remain the places where Greek and Latin are thoroughly taught. Such schools only take boys who are over 12 or 13

years old, to which they usually pass from preparatory schools. The public schools offer entrance scholarships, for which there is keen competition, and most of them give scholarships to help boys to proceed to the university.

Most of the public schools are old foundations, some of them, e.g. Uppingham, having been originally grammar schools, which were reformed and enlarged to suit their present purpose during the 19th century. Others, e.g. Wellington, are new foundations entirely.

In 1861 a royal commission was appointed to inquire into the condition of nine of the chief endowed or public schools, and important reforms followed its report, these being embodied in the Public Schools Act of 1868. The nine were Eton, Winchester, St. Paul's, Westminster, Charterhouse, Harrow, Rugby, Shrewsbury, and Merchant Taylors'.

The English public school system has spread to Scotland, where Fettes, Loretto, and other schools have been established; to Canada, Australia, and S. Africa, and to some extent to the U.S.A. Particulars of the chief public schools are given in *The Public Schools Year Book*, and their headmasters meet annually in the *Headmasters' Conference*. See *Education*; *Eton*; *Harrow*; *School*; *Shrewsbury*; *Winchester*, etc.

Public Trustee. English official appointed by virtue of the Official Trustee Act, 1906, which became operative, Jan. 1, 1908. He is a corporation sole whose business it is to act as executor and trustee of the estate of anyone in England who appoints him. The Act does not extend to Scotland or Ireland. He can be appointed alone, or with a co-trustee or trustees, and the great advantage of so appointing him lies in the certainty that the funds of the trust will not be frittered away, nor embezzled, nor lost in speculation, as sometimes happens in the case of a private trustee. He charges certain small fees, generally by way of percentage on receipts, for his services. Anyone who chooses may deposit his will, or a copy thereof, with the public trustee, for use when the time comes.

The Great War added considerably to the work of the department. Thousands of seamen's wills were deposited, and on the occasion of a naval mishap, hundreds of wills had to be administered at the same time. An important part of the public trustee's duties was acting as custodian of enemy property in England and Wales. The continued usefulness of the services of the

public trustee was seen in the report for the year ending March 31, 1923, when, as a result of the year's working, there was a surplus of £75,490, due mainly to reduction of expenditure owing to economies effected. The aggregate value of new business during the year was £15,332,309, and the number of new cases accepted was 955. The number of cases under administration on Mar. 31, 1923, was 15,600, having an estimated value of approximately £168,600,000. On April 1, 1921, a new and higher scale of fees came into force. The offices of the public trustee are Sardinia House, Kingsway, London, W.C., and there is a branch office at Albert Square, Manchester. Oswald R. A. Simpkin has been public trustee since 1919. There is also one for Ireland.

Public Worship Regulation Act. Act of Parliament, passed in 1874 to regulate the administration of the laws relating to the performance of divine service according to the use of the Church of England. It created a new court for the purpose, and any three parishioners could complain to the bishop of the diocese of alleged illegal proceedings in the Church services. He might veto the case at his discretion or allow it to proceed. Appeal lay from the decision of the judge to the judicial committee of the privy council. The punishment of a condemned incumbent was first inhibition and then deprivation. Lord Penzance was appointed the first judge of the new court. The Act has seldom been resorted to, and is virtually a dead letter. See *Ecclesiastical Law*.

PUBLISHING AND BOOKSELLING

William Heinemann, Founder of the firm of Wm. Heinemann, Ltd.

Other articles which may be consulted in this connexion are Book; Printing. See also the biographies of leading publishers, e.g. Chambers; Murray; Macmillan; and others

Publishing is the business of multiplying literary works. Bookselling is the business of distributing the multiplied copies. Before the invention of printing these functions were performed by the same person, and the copies were written in longhand. In antiquity copies of literary works were written on the bark of trees, papyrus leaves, skins, etc., and there was no general method of book production. In ancient Greece the small number of copies of books that could be produced were deposited in the state collections, where one copy served many readers. When these were supplied, some traders probably sold MS. copies to the public. There was little idea of writing for money, and authors bid chiefly for the laurel crown of contemporary fame. The Greek theatre had an influence so widespread, and was so generally visited by all sections of society, that it sufficed for the preservation of the great dramatic works of ancient Greece. Public rhapsodists and readers were a substitute for individual reading. In Alexandria, which was for centuries the great book-producing centre of the world, the first systematic effort was made to multiply Greek works which had been accepted as classics. The library of Alexandria was the world's great bookstore, the collecting station of all in search of knowledge. Its destruction by the Arabs, if we may trust tradition, was an irreparable loss to the world, and

was responsible for the disappearance of a large number of important works of classical antiquity.

In Rome we have in the Augustan period a clear record of a well-organized body of publishers; they had connexions in Athens, Asia Minor, and Alexandria, and employed Greek scribes for the copying of the works they acquired in the East. Their trade seems to have been with Italy, Spain, and Gaul, and as far even as Britain. In the writings of Horace and Martial we get the first indication of business relations between authors and publishers, and Cicero's friend Atticus (a patron of letters rather than a man of business) and the Sossii were Roman publishers of distinction. Imperial favour (e.g. of Augustus), or that of wealthy people such as Maecenas, contributed towards defraying the cost of production, but Roman publishers paid certain authors for the works they multiplied and distributed. After the fall of the Roman Empire, during a long period, all literary production was confined to religious orders, and in the scriptoria of the monasteries the functions of the copyists of the ancient bookshops were carried on. The earliest organized book trade, independent of that carried on by religious orders, we find in Bologna and in Paris, occupied chiefly in producing text-books for the universities.

Then in the middle of the 15th century came the invention of printing, which caused the greatest

revolution in the history of the world. By degrees, printing made the distribution of literary work and the rapid spreading of new ideas possible. At first the censorship of church and state handicapped free production, but that disappeared after a while with the growing enlightenment caused by the greater diffusion of knowledge. The gradual emancipation of literature led first to the establishment of copyright, national and then international, and by degrees to the recognition of the commercial value of literary work. The commercial exploitation of literary work for the benefit of authors is the business of the modern publisher, and it is satisfactory to see a constantly increasing effort on all sides, not only to take the fullest advantage of the value of literary property, but also to arrive at an equitable distribution of its economic produce among authors, publishers, and booksellers. Early producers of books after the invention of printing, whose names have been honourably handed down, were Aldus of Venice, the Elzevirs and Plantins of Antwerp, Caxton in England, and the Koburgers of Nuremberg. In the 17th century the amiable Tonson was probably the first modern publisher to collect around him a group of distinguished authors.

Printers and Publishers

Printer, publisher, and bookseller were in the early days of printed books combined in one person, but the three branches have, with few exceptions, drifted widely apart. In this division the description printer stands not only for the actual printer, but for the mechanical producer of the book, which includes paper-maker, binder, and the makers of all the materials that are required for modern books. The printer in this fuller sense of the word is usually employed by the publisher, who is in direct relation with the author, or his agent, while the bookseller is the distributor to the public of the manufactured article produced by the printer out of the author's work for the publisher.

The publisher's functions embrace, besides those of manufacturer, the selection of manuscripts suitable for publication, for which purpose he employs readers to supplement and correct his own judgement, and the commissioning of books on special subjects to suit the requirements of his market. For the former function good critical judgement is of the first importance, and also experience in finding the most suitable way of presenting the material offered. A

book will have a better chance in the market if it is produced in a way that appeals to the eye, imagination, and taste of the reader, and therefore the format of a book, the character it is printed in, the thickness of the paper, its opaqueness or transparency, the proper distribution of black on white, the legibility of type, proper margins, and suitable bindings, are all considerations to which the publisher must give close attention in order to get the best possible results.

Selection of Illustrations

To make a book as attractive as possible, the publisher supplies illustrations, which require the services of special artists, or photographers, maps, schedules, and other devices that adorn and illustrate or explain the author's intention. He naturally takes special heed in the case of each book of the requirements of the special public he appeals to, and if he manufactures for different markets he will give to each edition the special characteristics which are demanded in the market it is intended for. This is especially the case in popular works and fiction, less so in scientific works, which depend more upon the nature of their contents than on the mode of their presentation. In scientific works great care, accuracy, and lucidity are necessary in the technical presentation of illustrations, especially in books on intricate machinery, medicine, natural history, etc.

Most publishing firms have special lines to which they confine themselves; only a few publish books of a certain standard in almost any field of literature. The publications of general publishers often range over history, biography, belles lettres, fiction, poetry, etc. Publishers of specialties often confine themselves to one such field, as law, medicine, fine arts, sport, army and navy, maps, etc. Publishers of specialties naturally employ for the selection of their publications specialists, on whose opinion they can rely to a greater extent than does the general publisher, who is often almost as well able as a professional critic to judge of the chances of a manuscript submitted to him.

When a book is manufactured, and the publisher has fulfilled his original function of selection and manufacture, the business of distribution begins. This is done in different ways; by travellers who visit the booksellers with samples, by creating a demand through advertisements in the public press, by means of reviews which the public expect for their guidance in the periodicals they read, and here and there by means of canvassers who

sell books on the instalment plan—a plan adopted also in recent years by certain newspapers for the sale of expensive and lengthy works.

These methods of distribution are more or less universal, but there is a great difference in the method of display of new books between the system in all continental countries, where books are bound in paper covers, and in England and America, where cloth-covered books are the fashion. Paper-covered books are commonly sent out on publication in considerable quantities to the booksellers on sale or return, and every possible reader has thus an opportunity of actually seeing a new book when it is published. The greater expense of cloth bindings and the fact that they are easily soiled and damaged in transit render their speculative distribution impossible in countries where cloth-covered books are preferred. In these countries publicity is achieved chiefly by means of newspaper advertising, and the publisher has to create the demand which the bookseller does with greater ease and less expense where paper-covered books are the fashion.

Circulation by Booksellers

There can be no doubt that greater results are produced for the general run of literature by the local efforts of booksellers who can directly reach every likely reader of a new publication, while a fashionable novelty will probably gain particular impetus through newspaper advertising, which for serious and professional literature is extravagant and uncertain. The enormous distribution of German scientific literature, not only in German countries but in all parts of the world, is due to the system of sending out books on sale or return, and so is the enormous success of German propaganda. It is much to be hoped that publishers in other countries will in future try to find means for an equally effectual mode of distribution. This may involve the adoption of paper covers in place of cloth bindings, but in view of this possibility, it must not be overlooked that continental publishers have the burden of printing large editions in order to fill the demand for books on sale or return, which often results in heavy returns of dead stock. Expensive books and art publications are often sold through circularising. This is also the case with books printed in limited editions.

More original and often more lucrative than the issuing of ready-made MSS. are publications designed by publishers themselves, the writing of which is confided to

authors selected for the task. Principal among these are collective works, such as encyclopedias, which often require the employment of hundreds of collaborators, and much careful planning and organization, and also individual works planned to satisfy special interests. In this way publishers may be able to stimulate study and render invaluable services to education, progress, and national efficiency. The Dictionary of National Biography; the part publications of The Amalgamated Press, Ltd.; and in older days the Bohn Libraries are instances of such enterprise.

The bookseller's business can be roughly divided into four parts: (1) That of the wholesale bookseller, who buys in considerable quantities from the publisher, employs travellers and resells to the smaller firms, and enables them to buy small supplies on credit; (2) That of the export bookseller and shipper, who buys to supply chiefly the colonial and continental markets, and who receives special discounts to defray export expenses, including carriage, insurance, and duty, etc.; (3) The regular retailer; and (4) The second-hand bookseller. The last two alone affect the general reader.

The regular retailer is the real distributor to the public of all new publications, and the better establishments also carry a considerable stock of standard books, but very few establishments in Great Britain come up to the best standard of bookshops abroad. Few stock any but English books, or at the outside a few French novels, while there are on the Continent many booksellers who stock selections of the literature of most European countries. The bigger booksellers in London and the larger provincial towns, especially university towns, have fair stocks of standard books available, but there are very few booksellers in Great Britain who have sufficient knowledge of literature to advise their clients in regard to the best selection of books for any special study. Both in Great Britain and America very showy bookshops have been opened in recent years. Many of the American shops are superior to the British shops of this class, but the British bookseller is often better educated.

Second-hand booksellers have generally a wider acquaintance with literature than any others, for their purchases necessitate very considerable bibliographical knowledge. Their business is done chiefly through the distribution of catalogues and by correspondence,

and some British second-hand catalogues are of great value and excellence, praise which cannot be bestowed on British bibliographical publications in general. See Books and their Makers during the Middle Ages, 1896-97, and Authors and Publishers, new ed. 1897, G. H. Putnam.

Puccini, GIACOMO (1858-1924). Italian composer. Born at Lucca, Dec. 23, 1858, he studied under local teachers, and in 1877 produced a cantata, *Juno*. He worked at Milan conservatoire, 1880-83, and in 1884 his one-act opera, *Le*



Crispina was produced. His first great success was with *Manon Lescaut*, staged at Turin, 1893, and its triumph was outdone by that of *La Bohème*, founded on H. Murger's novel, 1896. His other works, the best of which are in the repertory of most great opera houses, are *La Tosca*, 1900; *Madama Butterfly*, 1904; *The Girl of the Golden West*, 1910; *La Rondine*, 1917; and *Il Tabarro*, *Suor Angelica*, and *Gianni Schicchi*, one-act operas, 1918. Puccini took the place left by Verdi as leader of the Italian operatic tradition. His masterpiece is probably *La Bohème*. He died Nov. 29, 1924.

Puck OR **ROBIN GOODFELLOW**. Mischievous, friendly fairy of English folklore. Puck, or a word of similar sound—Irish *puca*, Welsh *pucca*, Swedish *pojke*, Old Norse *puki*, Low German *pook*—is associated with a merry, familiar house spirit in the folklore of many peoples, and there is a curious parallel among the Red Indians of North America, for among the Algonquins *Puckwudjini* signified the little vanishing people. Puck is an important character in Shakespeare's *A Midsummer Night's Dream*.

Puck of Pook's Hill. Volume of stories, a blend of fairy tale, legend, and history, interspersed with poems by Rudyard Kipling, published in 1906. Two children playing on Pook's Hill are suddenly confronted by Puck, presiding genius of the place, who makes them figure in successive episodes from the days of the mythical Wayland's forge to Elizabethan times.

Pudding Lane. A London thoroughfare. It is a narrow way running S. out of Eastcheap to

Lower Thames Street. The Great Fire of 1666 is said to have originated in a house in this lane. See Great Fire.

Pudding Stone. In geology, name given to a rock consisting of the water-worn debris of other rocks. See Conglomerate.

Puddling. Name given to a process for converting cast iron into malleable or wrought iron. Invented by Henry Cort (*q.v.*) in 1784, the process consists in the removal of the carbon and silica—down to very minute proportions, and also the manganese and phosphorus and to some extent the sulphur, which cast iron always contains as impurities. The process oxidises these impurities, the carbon being converted into gas which escapes, and the silica and other elements into slags called by the puddler "cinder," which are skimmed off the surface of the molten mass at the proper stage.

Puddling is carried out in a special form of reverberatory furnace, having a tall chimney to ensure a good draught. Pig iron is melted on the bed or hearth of the furnace, and when quite molten, the furnace door is opened, and the surface of the melted metal thus exposed to the air. Iron oxide is at once formed, and is worked into the mass by the



Puck, the mischievous sprite of British folklore. From an engraving after Sir J. Reynolds, illustrating a scene from Shakespeare's *Midsummer Night's Dream*.

puddler by means of a "rabble," an iron tool with a long handle. Additional oxide may be introduced if required in the form of magnetite or haematite, or "blue billy," a burnt iron ore. As more oxide is worked in, the mass begins to get pasty, and the puddler begins to form it into balls weighing from 60 lb. to 80 lb., which he withdraws from the furnace as he completes them. See Frontispiece, vol. 6; Casting; Iron; Metallurgy; Steel.

Pudsey. Mun. borough of Yorkshire (W.R.), England. It is 3 m. from Bradford, with a station on the G.N. Rly. The industries include the manufacture of woollens and worsteds, iron and brass founding, and the making of machinery. S. Lawrence's Church is a fine, modern building, and the town has a mechanics' institute and a public park. The borough, which was incorporated in 1899, includes Fulneck, where a party of Moravians settled in 1745. Market day, Sat. Pop. 14,000.

Pudukkottai. Native state and town of Madras Presidency, India. The state is entirely inland, and is surrounded by the dists. of Tanjore, Trichinopoly, Madura, and Ramnad. The rulership was given to a Tondeman chief as a reward for assistance against the French and Haidar Ali in the 18th century. The town is centrally situated, and is the only urban area of any size. Area, 1,178 sq. m. Pop., state, 412,000; town, 26,900.

Puebla. Inland state of Mexico. It occupies one of the highest parts of Mexico, the centre being part of the Anahuac plateau, and lies between the states of Vera Cruz on the E. and Hidalgo, Tlaxcala, Mexico, and Morelos on the W. It is drained by the Atoyac, Salado, and other streams. The soil of the river valleys is fertile, and rice, sugar, coffee, cotton, etc., are cultivated. Cattle are reared, and minerals found, but not exploited to any extent. Cotton thread, calicoes and printed goods are manufactured in considerable quantities at the capital, Puebla, and at Atlixco. The area is 12,992 sq. m. Pop. 1,119,200. *Pron.* Pway-blah.

Puebla. Third largest city of Mexico. The capital of the state of Puebla, it stands on the Atoyac river, 65 m. S.E. of Mexico city, at an alt. of 7,200 ft. In the locality are several lofty mountains, among them Orizaba and Popocatepetl. One of the oldest and finest cities of the republic, Puebla has a handsome cathedral, little inferior to that in Mexico city, a state government building, the palace of justice, a state college, an epis-

copal palace, the Palafoxiana library, and an academy of fine arts. The industries include ironfounding, distilling, flour-milling, and the manufacture of cotton and woollen goods, tobacco, bricks, glass, and boots and shoes. The town is an important rly. junction having connexions with Mexico city, the port of Vera Cruz, and Oaxaca and other towns of the S. Founded in 1530, Puebla was occupied by the Americans in 1847, besieged by the French in 1862, and captured by them in 1863. It figured in the revolutionary troubles of 1914-15. Pop. 96,100.

Pueblo. City of Colorado, U.S.A. The second largest city of



Puebla, Mexico. General view of the city, with the cathedral on the left. Top, right, façade of the cathedral

the state, and the co. seat of Pueblo co., it stands on Arkansas river, 122 m. S.S.E. of Denver, and is served by the Atchison, Topeka, and Santa Fe and other rlys. The city possesses a state mineral palace, containing a collection of Colorado's mineral productions. An important distributing centre, Pueblo is celebrated for its iron and steel industries, and has large smelters, foundries, and boiler works, great stockyards, and furniture and firebrick factories. It is the market for the cattle, alfalfa, and sugar-beets produced on the great irrigated dist.

which extends 250 m. along the Arkansas, and of which it is the centre. In the neighbourhood are deposits of coal and other minerals, and large oilfields. Pueblo was founded in 1859, and became a city in 1873. Heavy loss of life and great

damage to property were caused by floods due to a cloudburst in June, 1921. Pop. 43,000.

Pueblo Indians (Span., village). Term denoting various North American Indian tribes in Arizona



Pueblo Indians. Old hunter from New Mexico. Top, left, head of a chief from Rio Grande



Pueblo, Colorado. The state mineral palace

and New Mexico. For the former see Hopi; the latter number (1915) 9,966. A pueblo usually comprises a many-chambered stone or adobe edifice of six or seven storeys, the roofs forming receding terraces. The cliff-dwelling and the Mexican *casa grande* represent early types of the pueblo culture, developed under the economic pressure of a deficient water supply. Monogamy prevails. The women build the houses, and make the best N. American pottery; the men cultivate crops and are the best N. American weavers. Their elaborate ceremonials, in underground halls (*kivas*), are mainly rainmaking rites. See American Indians; Zuni.

Puelche, South American Indian tribe in Central Argentina. An offshoot of the Chilean Araucanians, they intermingled with the Pampas Indians and the Patagonians, and produced various hybrid strains to which their name is loosely applied. Mostly wild, nomad horsemen, they migrated beyond the Rio Negro.

Puente del Inca (Sp., Inca bridge). Frontier post of W. Argentina, about 70 m. W. of Mendoza. It is on the route of the Andean pass of Uspallata (*q.v.*), which is traversed by the Transandine Rly. to Valparaiso.

Puente Genil. Town of Spain, in the prov. of Córdoba. It stands on the river Genil, 48 m. by rly. S. of Córdoba, and is a junction for the rly. to Jaén. The name is derived from a bridge (Sp. *puente*) over the Genil, uniting the old, higher town with the lower. It manufactures olive oil, flour, and linen goods. Pop. 14,200.

Puente Nacional (Span., national bridge). Town of Colombia, S. America, in the prov. of Santander. It stands on the Suarez, about 100 m. N. of Bogotá, and has coal and iron mines, and some minor manufactures. Pop. 16,000.

Puerperal Fever (Lat. *puer*, child; *parere*, to bear). Form of blood poisoning due to infection by micro-organisms during or shortly after the process of childbirth. This disease was at one time very common, and was responsible for a high mortality among mothers. The use of antiseptic methods, entailing scrupulous cleanliness on the part of doctor and midwife, and thorough sterilisation of all instruments and appliances used, has reduced the incidence of the affection to a very low figure. See Obstetrics.

Puerperal Insanity. Name given to mental derangement associated with pregnancy or parturition. The conditions which most frequently predispose towards

puerperal insanity are hereditary influences, seduction, shame, shock, and exhaustion following disease, frequent pregnancies, or prolonged lactation. The liability to insanity is greater in the first pregnancy than in succeeding ones. Four divisions are generally recognized: insanity of pregnancy, insanity of labour, insanity of the puerperium, and insanity of lactation.

Insanity of pregnancy first manifests itself about the third month, and most frequently takes the form of melancholia. Sometimes it is associated with a firm belief that the confinement will be fatal. Delusions and hallucinations may appear, and the woman may show a strong aversion to her husband. There is considerable risk of suicide in this condition.



Puente del Inca, Argentina. Natural rock bridge on the road from Argentina to Chile

In regard to the second division, insanity of labour, violent delirium occasionally occurs during the process of labour if the pains are severe, particularly if the woman is alone and without assistance. Recovery, as a rule, occurs rapidly after the child is born.

Insanity of the puerperium is insanity developing within the first two months after delivery. The form may be either mania or melancholia. Soon after delivery there may be acute delirium, generally passing off in a few days or weeks. Premonitory symptoms are insomnia and irritability. Hostility

may be displayed towards the husband, nurse, or child. Delusions and hallucinations may be present. Suicide or injury to the child may be attempted.

The term insanity of lactation is applied when the symptoms begin from two to eighteen months after delivery. Melancholia is the most frequent type, sometimes interrupted by periods of excitement. See Insanity.

Puerperium. Period following the birth of an infant during which the mother is recovering from the effects of labour. It may be regarded as extending in normal cases over five or six weeks. During this period the uterus or womb undergoes involution, *i.e.* gradual reduction in size, and the secretion of milk in the breasts becomes established. The puerperium is a physiological state, and although the woman requires special attention and care during this time, it should not be regarded as identical with illness. The pulse after delivery is usually slower than normal, and the temperature may for a few days be raised to 100. Slight disturbance may cause the temperature to rise readily to 101° F. or 102° F., but if the rise persists for any length of time, it may be a sign that untoward developments are occurring, necessitating careful examination. The mother should keep to her bed until from the tenth to the fourteenth day, and thereafter should daily accustom herself to gradually increasing physical effort. See Obstetrics.

Puerto Barrios. Seaport of Guatemala, Central America. It stands on Amatique Bay, an inlet of the Caribbean Sea, has a sheltered harbour, and is the terminus of the rly. which connects with the ruined city of Guatemala la Nueva, and thence to the Pacific. In 1917 a rly. line to Manoca (12 m.) was opened.

Puerto Cabello. Seaport of Venezuela, in the state of Carabobo. It stands on the Golfo



Puerto Cabello. Main street of the Venezuelan town

Triste, about 30 m. by rly. N. of Carabobo, and 80 m. W. of Caracas. The town is well provided with wharves and warehouses, and has a custom house, municipal buildings, etc. The chief exports are coffee, cocoa, sugar, cinchona, dyewoods, rubber, cattle, and animal products. In 1743 it resisted the attack of a British squadron, and in 1823 the last battle in the War of Independence was fought here. The fortifications were destroyed during the Anglo-German blockade of 1902-3. Pop. 18,300.

Puerto Cortés, formerly CABALLOS. Seaport of Honduras, Central America. It stands on the Gulf of Honduras, 9 m. N.N.E. of Omoa, and is the second port of the republic. It is the terminus of the rly. to the interior and La Brea on the Pacific. The harbour, the best on the N. coast, is spacious, sheltered, and deep, and the exports include cattle, hides, bananas, coffee, cedar and mahogany, vanilla, rubber, and gold. A large trade in cattle is carried on with Mexico. Pop. 2,500.

Puerto de Santa Maria, EL. Seaport of Spain, in the prov. of Cadiz. It stands on the river Guadalete, at its entrance to the Bay of Cadiz, 8 m. N.E. of Cadiz, on the rly. to Seville. It has a Moorish citadel, a 13th century Gothic church, a Jesuit college, and a celebrated bull-ring. Sherry is exported in large quantities, and large stone warehouses, or bodegas, for the storage of the wine have been erected. Salt is also exported. Manufactures include liqueurs, brandy, soap, starch, and glass. Pop. 18,000.

Puerto Herrera. Port of Honduras, Central America. In 1916 it was determined to establish the free port at the mouth of the Cruta river, in the Bay of Caratasca.

Puerto Madryn. Seaport of Argentina, in the terr. of Chubut. It stands on Nuevo Gulf, and is the coast terminus of the rly. to Trelew, a Welsh settlement, and Gaiman.

Puerto Montt. Seaport town of Chile, capital of the prov. of Llanquihue. It stands on Feloncavi Bay, at the head of Ancud Gulf, 60 m. direct E.N.E. of Ancud, and is connected by rly. with Valdivia, 125 m. to the N.N.W. It has an excellent harbour, and exports timber, wheat, and leather. Pop. 5,000.

Puerto Plata. Seaport town of Santo Domingo, W. Indies. It stands on the N. coast, with a sheltered harbour, and is a cable station connected with St. Thomas, Leeward Isles. It has connexion by rly. with the interior, and by steamship with the U.S.A. and

Europe. Of considerable commercial importance, it exports tobacco, cocoa, coffee, bananas, dyewoods, cotton, etc. Pop. 10,000.

Puerto Principe

OR CAMAGÜEY. East central prov. of Cuba. The second largest prov. of the island, it has a mainly undulating surface. It is well wooded, produces small quantities of sugar and tobacco, and has cattle-rearing and copper-mining industries. Its area is 10,076 sq. m. Pop. 193,000.

Puerto Principe

OR CAMAGÜEY. City of Cuba. The capital of the prov. of Puerto Principe, it is situated about 45 m. by rly. W. by S. of Nuevitas, its port. It carries on a trade in cattle and sugar. Pop. 93,000.

Puerto Real (Sp., Port Royal). Seaport of Spain, in the prov. of Cadiz. It stands on the Bay of Cadiz, 6 m. E. of Cadiz, on the Seville-Cadiz Rly. The Portus Gadetanus of Roman days, it was rebuilt 1483-88, and is now chiefly a sea-bathing resort. It has a 16th century church and a fine town hall. The chief exports are wine, oil, and salt. Shipbuilding and repairing are engaged in. Pop. 8,400.

Pueyrredón, JUAN MARTIN DE (1777-1850). Argentine soldier and statesman. Born in Argentina one year after the creation of the vice-royalty of Buenos Aires, he rose to the rank of general, distinguishing himself especially in the fighting against the British in 1806-7, which virtually brought the



J. M. de Pueyrredón, Argentine dictator

Argentine nation to a sense of its strength. After the founding of the United Provinces of the River Plate, 1816, Pueyrredón was proclaimed dictator, and wisely guided the young republic until 1825, living in retirement during the disturbed times that followed.

Pufendorf, SAMUEL VON (1632-94). German jurist. Born at Chemnitz, Jan. 8, 1632, he was educated at Leipzig and Jena. In 1661 he made a name by his Latin work on the Elements of Universal Jurisprudence, for which he was chosen professor at Heidelberg. In 1670 he went to Lund as professor, became historiographer to the king of Sweden, 1677, and in 1688

to the elector of Brandenburg. He died in Berlin, Oct. 26, 1694. Pufendorf's greatest work is his *De Jure Naturae et Gentium*, 1672,



Puff Adder. Repulsive, venomous serpent of Africa. Left, head with distended jaws, showing the poison fangs

and he is also known by some historical writings and owing to his disputes with Leibniz.

Puff Adder (*Clotho arietans*).

Venomous serpent, found in Africa. It is repulsive in appearance, having a very large, flattened head and thick and triangular body, 4 to 5 ft. long, usually mottled with various shades of brown on the back and sides and yellowish-white beneath. When angry they draw in their breath and inflate their bodies, whence their popular name. Their venom is very virulent, and their habit of lying half-concealed in the sand and not attempting to go away when approached make them very dangerous to travellers. See Snake.

Puff-ball (*Lycoperdon*). Genus of fungi of the natural order Gasteromycetaceae. The spore-bearing portion of the fungus is enclosed in a continuous wall of two layers, of which, by expansion of the inner, the outer layer breaks up into spines or warts. When the spores are ripe the inner wall opens at the apex to release them. Two common and graceful forms, covered with short spines or pointed warts, are *L. gemmatum* and *L. piriforme*, which are edible whilst the flesh is still white. The allied giant puff-ball (*Calvatia gigantea*), also affords food before the flesh turns brown. See Fungus.

Puffin (*Fratercula arctica*). Sea bird belonging to the auk family. The plumage is black on the crown, back, and wings, and white elsewhere. The bird is remarkable for its very large, adze-shaped beak, which is striped with brilliant red and orange. The decorations of the bill are shed in winter. It is found mainly on the N. shores of Great Britain, the N. temperate zone, and the Arctic, nesting in holes in the ground and crannies in the rocks, and often taking possession of rabbit burrows. In St. Kilda puffins are so numerous that the

ground is in places honeycombed with their holes. They feed upon small fish, and can store quite a number in the large beak when collecting food for their young. In winter most of the birds migrate to the Mediterranean." See Auk.

Pug Dog. Small toy dog of the mastiff group. It somewhat suggests a diminutive bulldog, from which it has probably been derived by a long process of degeneration. It is believed to be of Dutch origin, and was introduced into Great Britain in the time of William of Orange, being known as the Dutch pug. Its skull is broad, with a very short muzzle, the tail curls and lies close to the body, and the hair is very short and usually fawn-



Pug Dog. Champion specimen of the breed of toy dogs

coloured or black. One of its essential points is a black mole on each cheek, with a tuft of hairs growing from it. The pug is probably the most indolent of all dogs and loves to be pampered, for which reason it has a great tendency to put on fat. See Dog, colour plate.

Puget, PIERRE (1622-94). French sculptor, architect, and painter. Born at Château Follet, near Marseilles, Oct. 31, 1622, he studied in Italy. He painted several pictures for his native place, but is better known by his sculpture, in regard to which he was employed on public works by Fouquet and Colbert. His Milo of Crotona and Perseus and Andromeda were erected in the park at Versailles, and there is a Puget room in the Louvre. He died at Marseilles, Dec. 2, 1694. See Milo.

Puget Sound. Irregular inlet in the N.W. of Washington, U.S.A. An arm of the Pacific Ocean, with which it communicates by Juan de Fuca Strait, it has many branches and extends for a long distance into the interior of the state. Its length is 125 m. and breadth 5 m. to 25 m., and it is navigable throughout. On its shores are the ports of Tacoma, at its head, Seattle, and Port Townsend.



Puffin. Sea-bird remarkable for its large, brilliant-coloured beak

Puggaree (Hind. *pagri*, turban). Long, light scarf worn round the helmet as part of the British soldier's clothing in hot climates.

Pugilism (Lat. *pugil*, boxer; from *pugnus*, fist). Term for the now obsolete bare-knuckle fighting as distinguished from modern boxing (q.v.).

Pugin, AUGUSTUS WELBY NORTH-MORE (1812-52). British architect. Born in London, March 1, 1812, he



A. W. N. Pugin, British architect

was educated at Christ's Hospital and studied under his father, Augustus Charles Pugin. In his early days he was employed on stage scenery and other ventures, but soon turned to architecture, and having embraced Roman Catholicism, designed many churches for that communion. When the new houses of parliament were projected, he was called upon by Barry to provide the whole of the detail drawings. His alleged responsibility for the general design was the subject of sharp controversy.

Pugin lived at Salisbury and then at Ramsgate, building in the latter town a house and a church of his own, and indulging his favourite recreation of sailing. He ever insisted that Gothic was the only Christian style of building, and published his critical *Contrasts*; or a Parallel between the Architecture of the 15th and 19th centuries, 1836, and *The True Principles of Christian Architecture*, 1841. In the last year of his life he became insane through overwork, and he died at Ramsgate, Sept. 14, 1852. See Killarney.

Pugliese Aqueduct. Engineering work in Italy. One of the largest of its kind in the world, it was

completed in 1917. To carry water from the Apennines to the S., its main line goes for 133 m. from Caposele to Villa Castelli in Apulia; there it is divided. One short branch goes to Foggia, and the other to Bari, Lecce, and Taranto. Altogether it distributes water to 536 towns and about 2,000,000 people. In the main line there are 97 tunnels, three of these being each over 9 m. long.

Puise Judge. Official of various courts of law in the English high court. On the common law side all judges except the chief justice are called *puise* judges. The term is used in America, India, and the British dominions where the courts are constituted of a chief justice and other, inferior, judges. It is derived from old French *puisné*, younger and so inferior, Lat. *post natus*. born after *Pron. puny*.

Puket. Town of Siam. It is situated on the island of Junk, Ceylon. Here are rich tin mines. Pop. 20,000.

Pukow. Town in Kiangsu prov., China. On the Yang-tse river, opposite Nanking, it is the terminus of the Tientsin-Pukow Rly.

Pulaski, CASIMIR (1748-79). Polish soldier. Born at Wincary, Podolia, March 4, 1748, he fought



Casimir Pulaski, Polish soldier

for Polish freedom against Russia and became commander-in-chief of the troops of his country. The attempt to prevent a partition of Poland having failed, he fell into disfavour and went to France, where he met Franklin, the result being that he migrated to America, and took part in the War of Independence with Kosciusko and Lafayette, fighting with especial distinction at Brandywine and Germantown, and raising a corps known as the Pulaski legion. Wounded at the siege of Savannah, Oct. 9, 1779, he died two days later.

Pulborough. Market town of Sussex, England. It stands on the Arun, 11 m. from Horsham, with a station on the L.B. & S.C. Rly. The large church, partly Early English, contains some old brasses. Corn and cattle markets are held here. Pop. 2,000.

Pulci, LUIGI (c. 1432-87). Italian poet. He was born at Florence, and enjoyed the patronage of Lorenzo de' Medici, on whose behalf he more than once acted as confidential ambassador. Pulci's

chief work is *Il Morgante Magiore* (The Giant Morgante), 1481, a chivalrous romance, the central



Luigi Pulci,
Italian poet

figure of which is rather Orlando than the giant whom he subdued. The poem is the first great modern example of burlesque poetry. Lord Byron translated the first canto. See Introduction to Sir A. Panizzi's ed. of Boiardo, 1830; and *The Renaissance in Italy*, J. A. Symonds, new ed. 1897-99.

Pulex. Genus of insects, including fleas and chigoes. *Pulex irritans* is the common flea. Irritation from the bites may be relieved by the application of ammonia or dilute solution of carbolio acid. *Pulex penetrans*, the jigger or chigoe, is a tropical parasite, the female of which lays its eggs in the skin, leading to the formation of pustules. See Chigoe; Flea; Insect.

Pulham. Village of Norfolk, England. Pulham Market or Pulham S. Mary Magdalene is 3 m. from Harleston, with a station on the G.E. Rly. Pulham S. Mary the Virgin, or Pulham S. Mary, is nearer Harleston, also with a station on the G.E. Rly. There is an air-station at Pulham, established during the Great War.

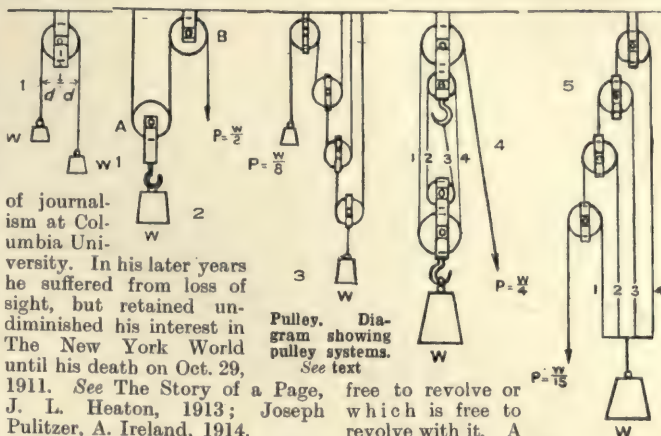
Pulikat. Town of Madras Presidency, India, in the Chingleput dist. It is situated at the S. end of Pulikat Lake, a shallow coastal lagoon of brackish water connected to the Buckingham Canal. It was formerly the chief settlement of the Dutch on the Coromandel coast. It is on the coast rly. N. from Madras. Pop. 6,000.

Pulitzer, JOSEPH (1847-1911). American journalist. Of Jewish descent on his father's side, he



Joseph Pulitzer,
American journalist

was born at Budapest, Hungary, April 10, 1847. Going to the U.S.A. in 1864, he served in the 1st New York Cavalry during the Civil War. In 1876-77 he was correspondent of The New York Sun in Washington and Europe, and in 1878 he bought The St. Louis Dispatch, which he amalgamated with The Evening Post as The Post-Dispatch. He acquired in 1883, and made a great property of, The New York World. He founded and endowed the school



Pulley. Diagram showing pulley systems. See text

of journalism at Columbia University. In his later years he suffered from loss of sight, but retained undiminished his interest in The New York World until his death on Oct. 29, 1911. See The Story of a Page, J. L. Heaton, 1913; Joseph Pulitzer, A. Ireland, 1914.

Pulitzer, WALTER (b. 1878). American author and publisher. Born in New York, April 4, 1878, and educated



Walter Pulitzer,
American author

privately, he founded and edited various periodicals and contributed much verse and fiction to the magazines. His books included a novel, *That Duel at the Chateau Marsanac*, 1899; *A Cynic's Meditations*, 1904; *Cozy Corner Confidences*, 1906; *Meditations of a Mean Man*, 1911; and the *Memoirs of his father, Albert Pulitzer*, 1911.



Pulkova, Russia. Observatory built by Tsar Nicholas I in 1839

By courtesy of Methuen & Co.

Pulkova. Village of N.W. Russia. It is situated on a mountain ridge 10 m. S. of Petrograd, and is the site of the famous observatory, built by the tsar Nicholas I in 1839. In the construction of Russian maps the meridian of Pulkova (30° 19' 40" E. of Greenwich) is often employed.

Pullet. Name applied usually to a hen chicken in its first year. The Royal Agricultural Show committee, however, restrict its use to birds hatched in the year of the show held in June. See Ancona Fowl; Fowl; Poultry.

Pulley. Wheel with a flat, convex, or grooved rim, mounted on a shaft or pin upon which it is

free to revolve or which is free to revolve with it. A grooved pulley is for use with ropes or chains, the groove serving as a guide to prevent the rope from slipping off. Pulleys with wide, flat, or convex rims are used in conjunction with flat belt driving; a convex rim serves to keep the belt central on the pulley.

As regards the principle of the pulley, Fig. 1 represents a pulley secured by its block or frame to a beam, with a cord passing over it on the ends of which weights W and W¹ are hung. As the distances d and d¹ are equal, by the law of the lever it follows that W and W¹ must be equal in order to balance each other. The same condition applies if the pulley be omitted and the cord passed over a fixed pin,

but in practice a pulley serves to lessen friction—the larger the pulley the less the necessary effort to overcome friction.

If, as in Fig. 2, one end of a cord be secured to a beam and passed round the movable pulley A and

the fixed pulley B, W will require only half its weight applied at P to balance it, for W is virtually suspended by two cords, and half its weight is borne directly by the beam, whilst the pull of the other half W/2 passes over the pulley B. By increasing the number of movable pulleys the effort of P to balance W is decreased by one-half for every pulley; thus in Fig. 3, P and W are in equilibrium when $P = W / (2 \times 2 \times 2) = W/8$. Combinations of pulleys are known as systems. Fig. 4 indicates the second system in which the same cord passes round all the pulleys, and in this case W is equally distributed between the four cords 1, 2,

3, and 4, from which it follows that $P = W/4$. The practical application of this system is seen in blocks and tackle. The first system is illustrated by Fig. 3, in which there is a separate cord for each movable pulley, one end of which is secured to a beam. In the third system, shown in Fig. 5, the ends of the separate cords are all attached to the weight, the cord 2 sustains twice the weight of No. 1, the cord 3 twice that of No. 2, and the cord 4 twice that of No. 3, and $W =$ the total pull of the 4 cords, or to express it as a formula, $W = P + 2P + 2^2P + 2^3P = 15P$, whilst the reaction of the beam is given by $W + P = 16P$.

Pullman. District of Chicago, U.S.A. It was founded as a model town in 1880 by G. M. Pullman for the employees of the company he established. Difficulties, however, arose soon after 1889, and the

town was made part of Chicago (q.v.). Another Pullman is a city of Washington, 80 m. from Spokane.

Pullman, GEORGE MORTIMER (1831-97).

American inventor. Born in Chautauqua co., New York, he began business first as a cabinet-maker and then as a building contractor. In 1859 he began his designs for a new type of rly. coach, and in 1863 built the first

Pullman sleeping-car. He carried out further improvements in railway carriages, and in 1887 invented the corridor train and introduced dining-cars. From his inventions he made a large fortune, and founded the model town of Pullman, afterwards incorporated with Chicago. See Railways.



Pullman. Exterior and interior of the saloon railway cars run on British lines

By courtesy of The Pullman Car Co., Ltd.

Pulp. Word used in a number of senses: (1) Material of which paper is made when ground up and mixed with water. (2) The soft part of any fruit, e.g. the pulp of an orange. (3) In mining, the pulverised ore mixed with water. (4) In dentistry, pulp is the soft sensitive tissue filling the central cavity of teeth. See Dentistry; Paper.

Pulpit (Lat. *pulpitum*, scaffold, stage, or desk). In ecclesiastical architecture, an enclosed stage or platform, raised above the level of the ground and congregation, from which the preacher delivers his sermon. Some have canopies or sounding-boards. The pulpit in Roman Catholic churches is generally on one side of the nave, often being built against one of the pillars dividing the nave from the north aisle; the handsomest examples, however, in point of design and carving, are independent structures. The marble pulpits of Siena Cathedral and the Baptistery at Pisa, both sculptured by Niccolò Pisano, are masterpieces. The wooden examples of the Low Countries include many splendid specimens of carving.

Pulpits for preaching were occasionally erected in the open, e.g. the famous pulpit by Donatello attached to the wall of the cathedral at Prato. Detached open-air platforms were used in England in the 16th and 17th centuries. See Mahomedan Art; Pisa; Preaching.

Pulque. Alcoholic beverage made by the natives of Mexico and Central America from the fermented juice of cacti or agaves. A favourite drink with the natives, to Europeans it has a sour, unpleasant taste.

Pulse (Lat. *puls*, meal, potage). Collective term for peas and beans and other leguminous plants and seeds.

Pulse (Lat. *pulsus*, beating). Expansion and contraction of an artery, caused by variations in the volume of blood propelled into the circulation at each beat of the heart. The pulse can be felt with the finger in any artery lying just beneath the skin, but is most conveniently examined in the radial artery a little above the wrist.

The pulse varies in rate, strength, regularity, and tension, and the character of each of these attributes furnishes information valuable in the diagnosis of certain constitutional conditions, and of various affections of the heart or arteries. At birth the pulse rate is between 130 and 140 beats a minute, and this gradually decreases during childhood, the rate in healthy adults being from 70 to 80. In old age the rate is usually from 65 to 70. The average pulse rate in women is a little higher than that in men of the same age. The rate is increased by muscular effort, fever, anaemia, and some other diseases, and is slower than normal in certain diseases of the nervous system. A frequent cause of irregularity in the pulse is excessive tobacco smoking. See Anatomy; Artery; Blood.

Pulteney, SIR WILLIAM PULTENEY (b. 1861). British soldier. Born May 18, 1861, and educated at Eton, he joined the Scots Guards in 1881. He served in the Egyptian campaign of 1882, was in Uganda, 1895-97, seeing active service in the Nandi expedition, where he won the D.S.O., and with the Guards went through the South African War, remaining with his regiment until 1908, when he was appointed to command the 16th brigade. In August, 1914, he was in command of the 6th Division, which he had held since 1910; but was put at the head of the 3rd corps, and led it until 1918. In 1915 Pulteney was knighted. He became gentleman usher of the black rod in 1920.



Sir W. Pulteney,
British soldier

Russell



1. Hexagonal, by Niccolò Pisano, built in 1260, Baptistry, Pisa. 2. Carved wood, by Verbruggen, 1699, S. Gudule, Brussels. 3. Modern marble, S. Alban's Cathedral, England. 4. Stone Arabesque, S. Sophia, Constantinople. 5. Carved ebony pulpit, cathedral,

Cuzco. 6. Carved wooden, in mosque of Ala-ed-din, Konieh. 7. Spiral staircase and carved wooden, with painted panels, Coptic cathedral, Cairo. 8. Open-air, ornamented, by Michelozzo and Donatello, cathedral, Prato. 9. Open-air, S. James's Church, Piccadilly, London

PULPIT: EXAMPLES OF CHRISTIAN AND MAHOMEDAN WORKMANSHIP

Pultusk. Town of Poland. It stands on the Narev, in the govt., and 35 m. N., of Warsaw. Its trade and industries are considerable. The ancient castle was formerly a residence of the bishop of Plock. Pultusk was the scene of the victory of Charles XII of Sweden over the Saxons in 1703, and of the French over the Russians, Dec. 26, 1806. Pop. 19,000.

Puma (*Felis concolor*). Large carnivorous mammal of the cat family, widely distributed through N. and S. America. It is easily recognized by its size, the body being nearly four feet long, and its uniform and unspotted tawny colour. Young animals are profusely spotted with black and have ringed tails, but they assume the colour of their parents when about six months old. There are several local varieties.

In N. America the puma is commonly known as the mountain lion or the panther, while in S. America it is called the lion or cougar. Native Indians call it "the friend of the Christian," on account of its harmlessness to man and its tendency to accompany him—apparently out of curiosity. But it is a dangerous foe to horses, cattle, deer, and dogs, and does great damage in the neighbourhood of farms and cattle ranches. In the forest regions it preys chiefly on monkeys and rodents. It usually spends the day in sleep, and roams by night in search of prey, which it kills by leaping on their backs and breaking their necks. A puma has been known to clear nearly 40 ft. in a horizontal leap and 20 ft. in a vertical one. It makes its lair in cavities in the rocks, and usually produces from two to four cubs in a litter. In captivity it is usually gentle and easily tamed.



Puma. Male and female of *Felis concolor*, a large American member of the cat tribe
Gambler Bolton. F. Z. S.

Pumice OR PUMICE STONE. In geology, name given to an effusive igneous rock possessing a spongy texture. Grey in colour, it has been formed by the expansion of occluded moisture when the molten rock reaches the surface. Pumice stone is characteristic of lavas of

ryhilitic composition, and is extensively used as a polishing, smoothing, and cleaning stone. Ground to a powder and mixed with soaps, it forms a constituent of many metal polishes. The finest pumice stone is obtained from the Lipari Islands. See Rhyolite.

PUMPS: VARIETIES AND USES

A. Williams, Editor, *Engineering Wonders of the World*
Articles which add to the information given herein include *Air Pump*;
Compressed Air; *Hydraulics*; *Sprengel Pump*; *Water Supply*

A pump is a machine used to move fluids. Pumps may be divided into four main classes according to their working principles: (1) Reciprocating pumps, which draw the fluid in by suction and expel it by the movement of a bucket, piston, or plunger. (2) Rotating pumps, without valves. (3) Pumps in which steam, compressed air, or

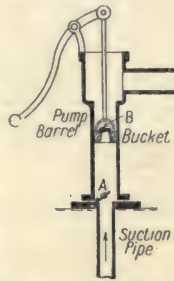


Fig. 1. Diagram showing principle of bucket pump.
See text

gas acts directly on the fluid. (4) Mechanical lifters, such as chains of buckets, which dip into the liquid. Though the pumps described in this article are of the kinds designed primarily to deal with water and other liquids, many of them differ only in detail from pumps used for air and gases

RECIPROCATING PUMPS. These may be subdivided into (a) bucket or lift pumps; (b) piston or force pumps; (c) combined bucket and plunger pumps.

The principle of the bucket pump is illustrated in Fig. 1. When the bucket is first raised, a partial vacuum is created in the part of the barrel below it, and water rushes in through the suction pipe, lifting foot-valve A. During the first down-stroke, the water below the bucket is trapped by the closing of A, presses open bucket-valve B, and passes to the upper side of it. Meanwhile the column of water

below B is prevented from falling, because it is subjected to atmospheric pressure at its lower end only.

When the bucket rises again, it carries the water above B with it, and simultaneously more water is sucked into the barrel through A. A bucket pump of this kind is single-acting, and discharges water only when the bucket rises. Fig. 2 represents a surface pump, which does most of the raising by suction. Theoretically a pump should suck through a vertical height of 34 ft.



Fig. 2. Surface pump, working by suction

Where water has to be lifted to great heights the pump barrel may be continuous with a rising main or delivery pipe of the same or greater internal diameter, and the pump rod work through the main, in which case the bucket can be drawn to the surface for repairs; or the top of the pump is closed in as in Fig. 2, and the water is delivered through a pipe connected with the barrel at the top. An extra valve is in some cases fitted in the delivery to relieve the

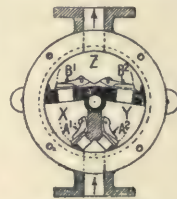


Fig. 3. Double-acting Wilcox semi-rotary lifting pump. See text

main valves and reduce leakage when the pump is not working; and if the suction lift is considerable a valve may be placed in the suction pipe just above water to keep the pipe full and make starting-up easier.

Fig. 3 is a section of a double-acting Wilcox semi-rotary lifting pump. The pump barrel is here replaced by a circular casing, closed at both sides. A diaphragm, fixed on a central spindle passing through one side to a handle, is

given a to-and-fro motion, and fits the inside of the chamber closely all round. The space below it is divided into two parts, X and Y, connected with the suction pipe by valves A^1 and A^2 respectively. When the diaphragm is rotated in a clockwise direction, water is

sucked into X, while the contents of Y are added to those of space Z by the opening of B^2 , and part of the total is expelled through the delivery pipe. During the reverse stroke X delivers and Y sucks in.

Fig. 4 shows a single-acting force pump. The second valve B is here attached to a stationary part, below the

Fig. 4. Single-acting force pump. See text

piston, which draws in the water during the out-stroke, and presses it from the cylinder during the in-stroke. A solid plunger, working through a water-tight gland, is often used instead of a piston, especially in pumps which have to work under very high pressure.

Fig. 5 is a diagram of a double-acting force pump, which takes in and expels water from each end alternately, A^2 working simultaneously with B^1 , and A^1 with B^2 . The air chamber on the delivery pipe relieves the working parts of sudden shocks (by virtue of the compressibility of the imprisoned air), and is used where high pressures are required, especially on quick, high-speed pumps.

The flap valve, hinged at one side, is the valve most commonly used. It may be of leather or rubber weighted with lead or iron, or be entirely of metal. Conical and mushroom valves and ball valves are preferable for quick-running pumps. Whatever kind of valve be used, the area of the way through should be ample to allow the water to pass without raising the valve far from its seat. A slow-closing valve causes serious loss of efficiency by the "slip" that occurs

while the valve is seating itself; and wear increases rapidly with the lift of the valve.

ROTATING PUMPS. The best-known pump of this class is the centrifugal, of which diagrammatic side and cross sections are given in Figs. 6 and 7. In principle it may be regarded as a water turbine reversed.

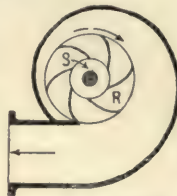


Fig. 6. Rotating pump. Diagram showing principle. See text

from the direction of rotation. The centrifugal force produced by the rapid rotation of the impeller presses the liquid in the impeller towards the periphery, and creates a vacuum at the central openings CC, into which liquid streams under atmospheric pressure from the supply chambers which are connected with the suction pipe.

On leaving the vanes, the liquid is caught in part of the exterior casing, so shaped that its capacity increases gradually towards the delivery end, and its kinetic energy is converted into pressure. A pump of the simplest type can be used for heads up to 100 ft., and will give an efficiency up to 86 p.c. For very high heads, up to 1,800 ft., multi-stage pumps are employed. These have several impellers, and the liquid passes from one to the other through specially shaped passages, gaining pressure at every stage.

Centrifugal pumps are particularly well suited for raising large quantities of water against moderate heads, and are much used for draining fens, and emptying docks. Their freedom from valves renders them invaluable for pumping liquid loaded

with sand, clay, and other solid matter. Those used in the Alexandra Docks, Newport, are each able to raise 100,000 galls. per minute (640,000 tons per day) against a head of 20 ft.

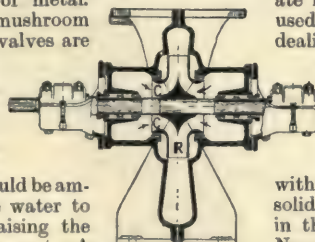


Fig. 7. Rotating pump. Diagram showing principle. See text

The gear wheel type of pump, Fig. 8, is a favourite on motor-cars for circulating cooling water and lubricating oil. The flow of liquid is shown by the arrows.

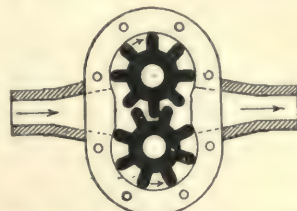


Fig. 8. Gear wheel type of pump used on motor cars

Another kind used for the same purposes, Fig. 9, has a drum A placed eccentrically in a circular casing, with which the ends make a good fit. The leaves B are kept pressed against the casing by a spring, and work in and out of their grooves as the drum rotates, scooping up liquid at the S end and delivering at the other.

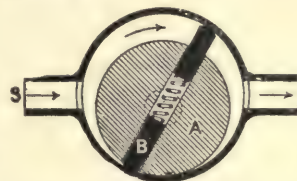


Fig. 9. Pump with eccentric drum. See text

A recent addition to the rotary class is the Rotoplunge, the principle of which is explained in Fig. 10. C is a circular casing in which a number of cylinders are bored radially. The pistons are all attached at their inner ends to a common connecting-piece, which, by means of projections engaging in eccentric grooves in the end

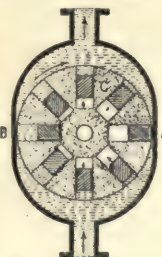


Fig. 10. Rotoplunge type of pump. See text

covers of the casing, draws each piston inwards while passing from A to B, and thrusts it out between B and A. As the water cannot pass the points A and B, each cylinder in turn charges itself from the suction side, and empties its contents into the delivery side.

PRESSURE PUMPS. The Humphrey pump is an example of the third class of pumps, in which an elastic fluid is used to expel the water. Five large pumps of this

kind are installed at the Chingford Pumping Station, to raise water through a height of 30 ft. from the River Lea into the Chingford reservoir. Their united capacity is 180 million gallons a day. The Humphrey pump is a four-stroke internal combustion engine of which the pump barrel is the cylinder, and a column of water, continually added to at the suction end, and subtracted from at the delivery end, is the piston.

Its working is explained by Fig. 11. C is the combustion chamber, V the inlet chamber, with two rings of many valves opening inward, T a stand-pipe, which forms part of the connexion between the pump and the delivery pipe D. Assuming the pump to be idle, water will stand inside it at the level W.L. of water outside. A charge of gas and air is introduced above the water and ignited. The explosion drives the column of water through the play pipe into T, up which it rises, losing some of its bulk through D. The momentum is such that the level of the tail end of the column falls low enough to create a partial vacuum in the combustion chamber, and more water enters through the inlet valves, while some air is sucked in through the scavenging valves S.

Presently the column comes to rest in the tower, and the water surges back, drives part of the products of combustion and the scavenging air out through the now open exhaust valves, E; shuts the valves; and rises into the combustion head, compressing the air, etc., which has not escaped and so being brought to rest. The pressure thus set up makes the water surge back, though not so vigorously as before, and again creates a partial vacuum, which is relieved by a fresh charge of gas entering through valves A and B. The momentum exhausted, the water returns again, compressing the charge, which is ignited electrically at the proper moment. An explosion occurs and the cycle begins over again. From this brief description it will be seen that water is taken in during the power stroke, and delivered during all strokes as long as the water in T stands above the delivery end of D, which is, of course, on a lower level than the top of T. The valves and the

ignition apparatus are controlled by movements of the water in the combustion chamber. Each of the four larger pumps develops about 250 horse-power, and the single smaller pump about 125.

In the Pulsometer pump, Fig. 12, water is forced up by the direct pressure of steam. The pump has two bottle-shaped chambers A and B, meeting at the top, where steam enters through the steam pipe into the one or the other, according to the position taken by a metal ball nicely balanced on the partition. Each chamber has a suction valve V^1 , V^2 , and a delivery valve

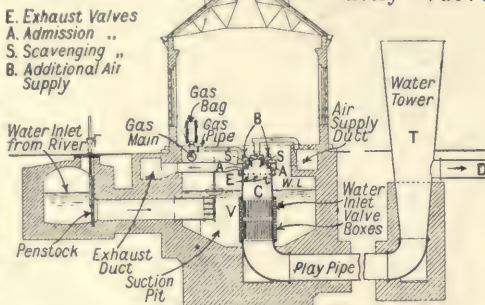


Fig. 11. Humphrey pump as installed at Chingford pumping station. See text

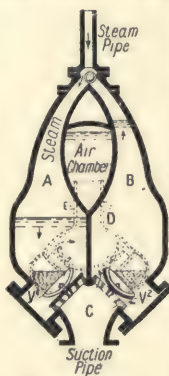


Fig. 12. Pulsometer pump, working by steam pressure. See text

more steam; then draws water from the suction chamber C through valve V^1 . At the same time steam enters B, and expels the water from it in turn, till the condensation level is reached, when A begins to discharge again, and B to fill.

In the air-lift, Fig. 13, compressed air is forced into a plain delivery pipe at a point well below the

water surface. The air escapes as large bubbles, which form a constant succession of elastic pistons and push plugs of water upwards in front of them; the total volume of water in the delivery pipe above the air entry being at any moment less than would be required to fill it to water level, W L. The efficiency of the air-lift decreases as the distance A B increases proportionately to distance B C, since a larger quantity of air is needed to aerate a given volume of water.

The hydraulic ram is a device for employing the momentum of a volume of moving water to deliver part of the water to a higher level than that of its original head. Fig. 14 illustrates the principle. Water falls through pipe A to a ram chamber, wherein is a valve V^1 . A delivery valve V^2 is kept closed while V^1 is open, by the greater pressure of the water in the delivery pipe. When the velocity of water escaping through the openings O O reaches a certain figure, V^1 is suddenly forced up against its seating, and the trapped water opens V^2 , and invades the delivery pipe until its momentum is destroyed. Then V^2 closes, and V^1 opens again. The proportion of water delivered decreases with increase of lift.

The quantity D delivered will be equal to half the quantity F that enters the ram chamber multiplied by $\frac{WZ}{YX}$ in feet where WZ=the working fall and YX=the total lift from the ram. Thus, if the working fall be 10 ft., the delivery head 100 ft., and F 200 gallons per minute: $D = \frac{200}{2} \times \frac{10}{100}$ gallons per

minute. According to the Engineers' Year Book a ram actually at work, with a fall of only 10 ft., raises water 340 ft. through three miles of piping.

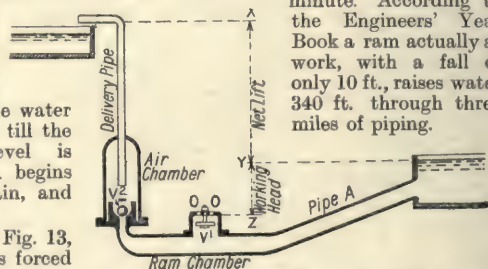


Fig. 14. Pump working on hydraulic ram principle. See text

Pumpernickel. German bread made of coarse, unbolted rye. It is very heavy and of doughy consistency, with a hard outer crust, and is somewhat acid in taste. Sometimes a glazing flavoured with caraway seeds is given to this bread, which is largely made in Westphalia.

Pumpkin. (*Cucurbita pepo*). Trailing and climbing annual herb of the natural order Cucurbitaceae.



Pumpkin. Fruit, and stalk with male flower, leaf, and tendril; inset, female flower

Its native country is unknown. As a cultivated plant it was introduced to Britain from the Levant about 1570. The bristly, succulent stems bear five-lobed leaves and strong spiral tendrils by means of which it climbs bushes. The large yellow flowers are unisexual, though both male and female grow on the same plant. The females are distinguishable at sight from the presence of the ovary below the calyx. This develops into the enormous fruit or gourd pumpkin, sometimes weighing over 20 lb. The vegetable marrow and the squash are cultivated varieties of this species. Though not so popular as the marrow, the pumpkin can be cooked in a variety of ways, the best known of which is pumpkin pie. It is easily grown from seeds sown in spring in a gentle heat, and the young plants are set out of doors when there is no danger of night frosts. They succeed in most soils, but do best above a heap of well-covered manure; they require an abundance of water when fruiting. See Gourd; Vegetable Marrow.

Pump Room.

Room in the buildings attached to a mineral spring, and in which the waters are drunk by persons undergoing a cure. The most famous

place of the kind in England is the pump room at Bath, which, under the autocratic rule of Richard Nash, was made the capital of the province of pleasure for the fashionable world from about 1706 until his death in 1761. Tunbridge and Scarborough were rather repaired to for relief, though in the time of Charles II the former was a frequent resort of the court. Aix, Baden, and Homburg are Continental spas with famous pump rooms. See Nash, Richard; Spa.

Pun. Play upon the similarity of sound in words of different significance. The word is supposed to derive from the A.S. *punian*, to pound or bruise, and thence to indicate a pounding of words into a new sense. At its best the pun is rare wit, sharpening and clinching the thought to which it owes its being; at its worst it is contemptible word torturing.

Apart from the happy conversational puns of scores of quick-witted people, the greatest puns are those of Thomas Hood, in whose work the pun achieved an acknowledged position as a literary form. Other users of the pun as an aid to wit, more especially conversational wit, were Charles Lamb, Sydney Smith, Douglas Jerrold, and O. W. Holmes. With the mere word twisting which passed for punning in the burlesques and pantomimes of the latter part of the 19th century the pun fell into discredit. See Addison's essay in *The Spectator* (No. 61) for the history of the pun, and Birch's letter in *The Guardian* (No. 36) for its apology.

Puna. High Andean plateaux stretching from Colombia to Chile. Being bounded by the higher rims of the Andean chains they resemble vast troughs. Their great elevation gives them a cold, bleak climate which, together with the little precipitation, restricts the natural vegetation to poor tuft grass and other low plants. On the lower punas, however, the conditions re-

semble those of the world's poorer grasslands, and pastoral occupations can be pursued. The name is also given to the cold, dry wind which prevails on these plateaux. See Andes.

Punakha. Chief town of the independent state of Bhutan, India. It is situated on the edge of the Himalayas on the Sankosh, a small tributary of the Brahmaputra. In 1905 a peaceful mission penetrated to the town, about which little is known.

Punan. Indigenous tribes of Indonesian stock in Sarawak and central Borneo. Estimated at 100,000, round-headed, pale-yellow, muscular, they are inoffensive jungle nomads, wear bark waistcloths, possess rude leaf shelters, and subsist on wild sago, fruits, and game hunted with blowgun and poisoned darts.

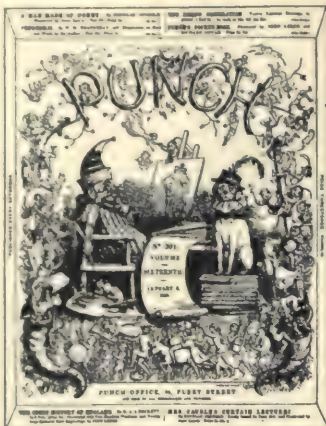
Punch. Alcoholic beverage made of spirits and fruit juice, spice, sugar, and hot water. The name and the drink were originally Indian, *punch* being Hindi for five—the five essential ingredients including arrack and tea. According to the spirit used, punch is called rum, brandy, or whisky punch. Wine or even ale is sometimes added. Milk punch is made of milk and rum, generally bottled, and drunk cold.

Punch OR THE LONDON CHARIVARI. British illustrated weekly journal. Devoted to social and political satire, humour, and literary and dramatic criticism, its first issue was published June 17, 1841. Ebenezer Landells, Henry Mayhew, Mark Lemon, and Stirling Coyne were chiefly concerned with its production, and for a short time the three last named were joint editors. Then Mark Lemon became chief editor, and retained this position until his death in 1870. Succeeding editors have been Shirley Brooks, 1870-74; Tom Taylor, 1874-80; Sir F. C. Burnand, 1880-1906; and Sir Owen Seaman. Punch became in 1842 the property of Bradbury & Evans, a firm known since 1872 as Bradbury, Agnew & Co. The original cover was the work of A. S. Henning; second by Hablot K. Browne (Phiz), Jan., 1842; third by W. Harvey, July, 1842; fourth by Sir John Gilbert, Jan., 1843; fifth by Kenny Meadows; sixth by Richard Doyle, Jan., 1844; and the seventh and present cover, by Richard Doyle, Jan., 1849. The original price of 3d. was maintained until 1917, when the extra cost of materials due to the Great War forced it up to 6d.

Punch has been censored in Russia, Germany, and France;



Pump Room at Bath, from the gallery. In the alcove is a statue of Richard Nash



Punch. Replica of the first issue of Doyle's cover, Jan. 6, 1849

By courtesy of the proprietors of Punch

but, on the whole, while pricking bubbles, it has reflected week by week the best and most representative feeling of the nation, as well as its follies and foibles, and many a good cause has found in it a helpful friend. Reprints in various forms, e.g. Pictures from Punch, 4 vols., 1906; the Punch Library of Humour, ed. by J. A. Hammerton, 25 vols., 1907; and Mr. Punch's History of Modern England, by C. L. Graves, the opening volumes of which appeared in 1921, bear witness to its permanent appeal. British art and letters are equally well represented in its pages, and scholarship has given an edge to its wholesome fun. Numbers of its cartoons, as Leech's General Février Turned Traitor, 1855; Tenniel's Dropping the Pilot (Bismarck), 1889; and Bernard Partridge's King Albert (Unconquerable), 1914, have become historic. Much of its verse, as Tom Hood's Song of the Shirt, 1843, and Tom Taylor's Abraham Lincoln, 1865, are permanent additions to English literature; and numbers of its jokes, as Advice to persons about to marry—Don't! or the frugal Scot's Bang went Saxpence! have passed into proverbs.

Among those who have sat round the staff table at the weekly dinners, in addition to those named already, are the à Becketts, F. Anstey (Guthrie), Alfred "Crowquill," George Cruikshank, Harry Furniss (who for many years illustrated the Diary of Toby, M.P.), Douglas Jerrold, R. C. Lehmann, Percival Leigh, Charles Keene, E. V. Lucas, Henry Lucy (so closely identified with the Essence of



Parliament), George du Maurier, Phil May, E. J. Milliken, L. Raven-Hill, E. T. Reed (of Pre-historic Peeps), Linley Sambourne, Albert Smith, W. M. Thackeray, and F. H. Townsend. See Charivari; Keene, C.; Omnibus; consult also The History of Punch, M. H. Spielmann, 1895; The à Becketts of Punch, A. W. à Beckett, 1903; Records and Reminiscences, F. C. Burnand, 1904; A Great Punch Editor (Shirley Brooks), G. S. Layard, 1907.

Punch and Judy. Name of an English puppet play, performed in the streets by itinerant entertainers. The performer is concealed in a portable frame covered with cloth, the upper part of which is open in front, forming a small covered stage. The puppets are moved from below by the hands of the performer, who utters the dialogue in a nasal falsetto, varied to suit the characters. There have been various forms of the play, but the hero, Punch, is always a violent, pugnacious, but droll and high-spirited rascal, hunch-backed, hook-nosed, and gaily dressed, who with the help of a stout oudgel overcomes all his enemies in succession. In one version, Punch, having murdered his child and his wife, Judy, flies from an officer of the law, escapes from the Spanish Inquisition, and repels various antagonists, including Disease, Death, and the Devil. Punch is commonly accompanied by a small live dog, Toby.

Punch, originally called Punchinello, appears to have been introduced to England from France



Punch and Judy show. From the painting by Webster. Top, left, automobile Punch and Judy show

at the Restoration, but did not gain great popularity until the reign of William III, when the show may have been modified by the influence of Dutch puppet plays. Addison devotes an article in The Spectator (No. 14) to the play. Judy is a familiar form of the once common name Judith, and Toby, as a dog's name, is due to the dog of Tobias in the Book of Tobit. See Marionettes; Punchinello; Puppets; consult also Punch and Judy, J. Payne Collier, illus. by G. Cruikshank, 5th ed. 1870.

PuncHESTOWN. Racecourse in co. Kildare, Ireland. In the parish of Rathmore, it is 2 m. from Naas and 24 m. from Dublin, with a station on the G.S. & W. Rly. It is noted for its steeplechases, the most important meeting taking place every April.



PuncHESTOWN, Ireland. Taking the stone wall in the Maiden Plate steeplechase on PuncHESTOWN racecourse

Punchinello. Older form of the name Punch in the Punch and Judy show. It is adapted, probably,



Punchinello, as he appeared on the old Italian stage

through the influence of the old word *punch*, short and fat, from Fr. *Polichinelle* or Ital. *Policinella*, more commonly *Pulcinella*. This character appears in the Italian *Commedia dell'Arte* (*q.v.*) about the beginning of the 17th century, and originated in the neighbourhood of Naples. Traditionally represented with a black mask and a hooked nose, he is a boastful country clown, the hero of ridiculous and rascally exploits, and not devoid of wit. *Pulcinella* apparently means little chicken, though the origin of the name has been much debated. The character was soon transferred from the theatre to the puppet show, and in this form was adopted by the French, who made him dwarfish and hunch-backed, and the mouth-piece of much railery and satire. The English *Punchinello*, whose rôle was long much less restricted than that of the conventionalised *Punch*, resembles his French original in his unflinching impudence and hilarity.

Punctuation (Lat. *punctum*, point). Method of dividing written words by a system of conventional marks, called points or stops, into sentences and clauses. It is done for the quicker apprehension of their meaning by the eye, and the avoidance of misunderstanding of their purport, and as a guide to intonation in reading aloud. Aldus and Paulus Manutius (*q.v.*), the 16th century printer-publishers of Venice, were the first to introduce systematised punctuation into printed books, and the advantages of the device speedily conquered the world. In non-inflectional languages, such as English, where position chiefly determines the relation of words, long sentences would be almost unintelligible without some such assistance.

Four principal marks are in use: the full point, or period (.), marking the end of a sentence; the colon (:), marking a shorter pause, properly placed where the sense is continued independently of

grammatical construction, and best employed only to introduce a formal statement; the semi-colon (;), denoting a still shorter pause and separating the conjunct members of a sentence; and the comma (,) marking the shortest division of a sentence and indicating the shortest pause in reading aloud. In addition, the notes of interrogation (?) and of exclamation (!) indicate a question and admiration or surprise respectively. Quotation marks (" ") often called "inverted commas," mark the beginning and end of a quotation or passage of dialogue in narrative; and the dash (—) is used to suggest hesitation, or to introduce a word or thought supplementary to something said just previously.

Pedants have raised punctuation to the dignity of a mystery. Theoretical rules for its application are of little use. Common-sense, reinforced by the ear, is the best guide for the author, and printers generally follow rules laid down in their respective establishments. See *Colon*, *Comma*, etc.

Pundit (Hindi *pandit*, learned man). Designation of teachers, especially of Sanskrit and Hindu scholars. The term is also applied to skilled native topographical surveyors, some of the earliest having been schoolmasters. In the old supreme court of India the Hindu adviser of the British judges was called the pundit.

Pungue. River in Portuguese E. Africa, rising in the Inyanganga range in Mashonaland, Rhodesia, and falling into the Indian Ocean at Beira. It is navigable for about 100 m. by small steamers. It was first explored by Sir L. S. Jameson and Frank Johnson.

Punic Wars. Series of wars fought between the Romans and the Carthaginians, or Poeni, for the mastery of the western Mediterranean. In the first Punic War (264–241 B.C.) the cockpit of the struggle was Sicily, the largest portion of which was in the hands of the Carthaginians. The Romans, who were not a seafaring people and had no fleet, were at a serious disadvantage against Carthage.

By 260, however, the Romans had built themselves a fleet, and by the use of boarding bridges gained under Duilius a great victory at Mylae, on the N.E. coast of Sicily. In the fighting in Sicily, the Romans had the advantage of the co-operation of Hiero of Syracuse, while the greatest asset of the Carthaginians was the skilful generalship of Hamilcar Barca, who with a comparatively small force held the Roman armies at bay over a long period. In 256 the

Romans attempted to create a diversion by sending an expedition to Africa under Regulus (*q.v.*).

At first successful, the army of Regulus was eventually completely defeated in 255, and the struggle again centred in Sicily. The Romans captured Panormus in 254, and defeated the Carthaginians in battle near that town in 251, but the war dragged on, and it was not until 242 that success finally passed to the Romans by another great naval victory near the Aegates Insulae off the W. coast of Sicily. The defeated Carthaginians were unable to continue to send supplies to their stronghold of Lilybaeum, which had been besieged by the Romans for ten years. With the fall of Lilybaeum, the Carthaginians were forced to give up Sicily, and the two belligerents were glad to make peace.

In the Second Punic War (218–201 B.C.) the scene of the first fighting was Spain, where the Carthaginians, endeavouring to carve out a new dominion for themselves to compensate for the loss of Sicily, came into conflict with the Romans, who had also been extending their dominion in the same quarter. In 218 B.C. Hannibal conceived the idea of carrying the war into Italy. Leading an army across the Pyrenees, and across the still more formidable barrier of the Alps, he descended into the valley of the Po, and after victories at Lake Trasimenus, 217, and Cannae, 216, seemed to have Rome at his mercy. The Greek cities of S. Italy joined him, and Syracuse changed sides. The central Italian states, however, stood firm for Rome.

A skilful general was found in Quintus Fabius Maximus, surnamed Cunctator (Delayer) on account of his non-forward policy. Fabius resisted all temptation to risk a pitched battle, contenting himself with harassing Hannibal on every possible occasion, in the belief that he would thus wear down his strength. These tactics were successful, and the Romans secured a breathing space in which to recover their strength. In 207 the decisive battle of the war, reckoned as one of the decisive battles of the world, was fought.

Hasdrubal, brother of Hannibal, who had had charge of the Carthaginian forces in Spain, outwitted Scipio, the Roman general opposed to him there, and made his way to Italy, with reinforcements. Before he could effect a junction with his brother, however, he was defeated and slain at the battle of the Metaurus. Henceforward Hannibal was doomed. In 206 Scipio decided to carry the war into the enemy's

country, and landed in Africa with an army in 204. Hannibal was recalled in the following year, but at the battle of Zama in 202 his army was completely defeated by that of Scipio. By the terms of the peace concluded shortly afterwards the Carthaginians were compelled to pay an indemnity of £2,350,000 over a period of 50 years, to reduce their navy to ten ships, and to give up Spain.

Carthage was thus reduced to a shadow of her former self. Her commercial prosperity, however, began gradually to return, and

Punishment (Lat. *punire*, to punish). Infliction of pain or suffering for a misdeed. From early historical times some form of definite punishment of individuals by the state has been recognized. The early forms were based upon the principle of retaliation, i.e. the infliction of corresponding pain or suffering upon those who had caused them. This theory of punishment remained in wide practice until the middle of the 19th century, when theories of reparation and prevention gradually made headway.

Such barbarous forms of punish-

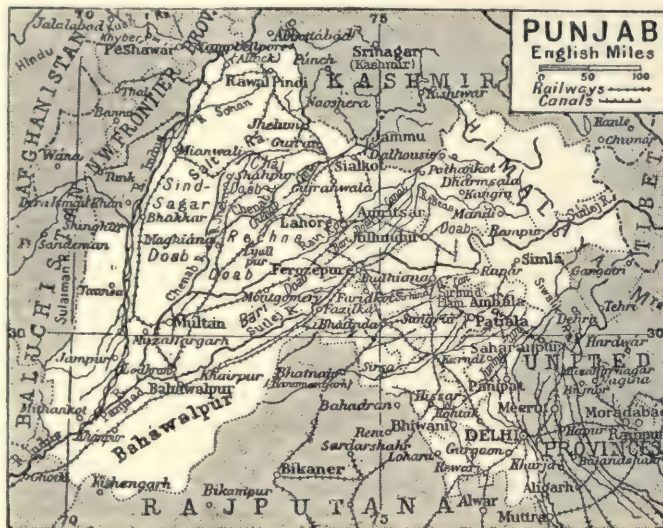
the form of fines, and those involving the deprivation of certain rights of citizenship, e.g. the capacity to hold office.

The broad theory is that punishment should act as a deterrent; should penalise the offender only and not the innocent; should be elastic for any particular offence, i.e. should avoid a fixed penalty, as a fine which presses heavily on the poor and has little effect on the rich, and also to enable a varying degree of punishment to be awarded to suit the varying degree of guilt; and should be such as not to destroy the moral sense of the offender or of those carrying out the punishment. See Capital Punishment; Crime; Criminology; Flogging; Penology; consult also Ancient Law, Sir H. J. Maine, 10th ed. 1906; History of Penal Methods, George Ives, 1914.

Punjab OR PANJAB. Prov. of India. It is the land of the five rivers, Jhelum, Beas, Ravi, Chenab, and Sutlej, which unite as the Panjnad, a left bank affluent of the Indus. It lies N.W. of the United Provinces, N. of Rajputana and Sind, and E. of the N.W. Frontier Province, detached from it in 1901. British Punjab comprises 97,000 sq. m., of which 11,000 sq. m. are highlands; the Punjab native states cover 36,500 sq. m., of which 12,000 sq. m. are highlands; the highlands being the Himalayan and Siwalik Ranges. N. of the Salt Range between the Indus and the Jhelum is a tableland from 1,000 to 2,000 ft. alt. much dissected by the streams. The plains cover an area almost as large as the British Isles and are usually stoneless, treeless, semi-arid tracts of alluvium.

The plains comprise five doabs: Jullundur between Sutlej and Beas, Bari between Beas and Ravi, Rechna between Ravi and Chenab, Chaj between Chenab and Jhelum, and Sind-Sagar between Jhelum and Indus; the Sirhind Plain between the Sutlej and the Jumna on the high land between the Indus and Ganges river systems; and Bahawalpur between Rajputana and the Indus-Panjab-Sutlej.

Owing to the dryness of the air, the climate tends to extremes of heat in the early summer and frost and cold in the winter; the monsoons bring heavy rains in the late summer, and there is a second rainy period in the winter. The Punjab differs from the rest of India in the cold weather rains and the aridity of the plains. The latter has caused the government to construct the finest system of irrigation canals in the world; the chief of these perennial canals are five in number:



Punjab. Map of the province in the north-west of India

this aroused the jealousy of Rome, where there was always a strong party which believed that the only safe policy was the complete destruction of Carthage. The "De lenda est Carthago" (Carthage must be destroyed) of the elder Cato has passed into a proverb. In 149 occasion was found to pick a quarrel with Carthage, and the third Punic War (149-146 B.C.) began. After a vain endeavour to placate Rome, the Carthaginians took up arms, prepared for desperate resistance. No success at first attended the Roman arms, until the arrival in Africa of P. Cornelius Scipio, a descendant by adoption of the conqueror of Hannibal. Scipio brought about the fall of Carthage in 146. The city was razed to the ground, and the territory of Carthage became the Roman province of Africa. See Carthage; Hannibal; Rome; consult also Rome and Carthage, R. B. Smith, 3rd ed. 1883; The Second Punic War, T. Arnold, 1886; History of Rome, T. Mommsen, Eng. trans., rev. ed. 1901. John McBain

ment as breaking on the wheel, burning at the stake, hanging and quartering, also aimed at making the punishment so terrible as to act as a deterrent to others, but in this they wholly failed, and it is still a matter of controversy whether such punishments as death, flogging, etc., are deterrent in their operation or not. In the army and navy punishments have been even more severe, with the object of preserving discipline, than they have in the civilian code. Keel-hauling (*q.v.*), flogging with the cat-o'-nine tails, and hanging were common up till the 18th century in the British navy, and in 1749 out of thirty-six articles of naval punishment no fewer than ten awarded the death penalty without any alternative, and twelve others had death as an alternative. The articles failed through their very severity, and have been mitigated by a number of Acts, as have those of army punishments.

In recent years additional forms of punishment have come into prominence, those of compensation in

Jhelum, Bari Doab, Chenab, Sirhind, and Western Jumna.

The arid plains of the S.W. and the highland native states of the N.E. are scantily peopled; between these two the density of population decreases with distance from the Himalayas, except in Rohtak and Gurgaon in the S.E. Nearly 60 p.c. of the people depend on tillage and 20 p.c. on the primitive handicrafts of the weaver, potter, leather-worker, carpenter, and blacksmith. The people include agricultural Jats (20 p.c.), efficient and hard-working cultivators and excellent soldiers, agricultural Rajputs (7 p.c.), generally poor cultivators, Brahmans, Arains, and Kambohs. The chief vernaculars are Lahndi on the W., Panjabi in the centre, and W. Hindi in the S.E. Less than four p.c. are able to read and write, but the government has established high schools for boys, anglo-vernacular and vernacular middle schools, and primary schools.

The first rly. was opened in 1862; the trunk line connects Lahore with Delhi and Karachi and runs N.W. to Peshawar beyond the Indus; most of the connecting lines cross the plains S.W. or S.E. of the trunk line.

Wheat and barley are the chief crops, wheat covering a quarter of the tilled area. They are winter rain crops, reaped in the spring, in March and April. Millets, pulses, sugar-cane, cotton, and rice are also grown. Much of the wheat is exported, via Karachi.

The history of the Punjab and adjacent areas is of considerable interest, in view of the fact that the mountainous ramparts of the Himalayas, Hindu Kush, and Suleiman Mts. tend to restrict human migrations. Alexander the Great invaded the Punjab from the W., and reached the Beas (Hypasis) before he turned back, in 326 B.C. Greek rule ceased when he died, three years later. Asoka, 273-231 B.C., had a long and peaceful reign; for the next twelve centuries the country was dominated by foreign invaders, or split up into numerous petty states. The raids of Turkish soldiers of fortune from the W., notably Mahmud of Ghazni (d. 1030), during the tenth and eleventh centuries, resulted in the overthrow of Buddhism. From 1206, for three centuries, Turkish and Afghan sultans ruled from Delhi a kingdom of varying dimensions; during this period the Mongols came, first in 1221, under Jenghiz Khan, and later from 1240 to 1303, at irregular intervals, to ravage the land. Tamerlane, in 1398-99, led his massacring Turks to Delhi, and sacked the royal city.

From 1556 until 1707 the Punjab was strongly ruled by Mogul emperors, beginning with Akbar and ending with Aurungzebe; Lahore became their great city. Between 1738 and 1762 Nadir Shah eight times, and Ahmad Shah six times, invaded the Punjab from Persia; the Sikhs rose then to power, and Ranjit Singh, 1799-1839, suppressed all rivals. In 1809 Ranjit Singh pledged himself by treaty with the British to make no conquests S. and E. of the Sutlej. The successors of the great maharaja failed to uphold the pledge, and were defeated in the first and second Sikh Wars, and the Punjab was annexed by Britain in 1849. Much unrest was manifest in 1919-20, serious rioting taking place at Amritsar (*q.v.*) and other places. See India; Indus; Nauteh Girl; consult also The Punjab, North-West Frontier Province, and Kashmir, J. Mc. C. Douie, 1916.

Punjab, UNIVERSITY OF THE. Indian university. Founded in 1882 at Lahore, it was at first an examining body, controlling two colleges, the Oriental college and the Law college at Lahore. Later it undertook the maintenance of professors and teaching work generally. It gives degrees in Oriental knowledge, law, arts, medicine, science, agriculture, and commerce, and has a library and an observatory.

Punkah (Hindustani). Name for a large fan used in India. It is fixed to the ceiling, and worked by



Punkah, the Indian fan suspended from the ceiling and worked from outside the house

a cootie. The word originally meant a small fan, made from the leaf of the palmyra.

Puno. City and dept. of S.E. Peru, on the borders of Bolivia. The dept. has an area of 41,198 sq. m., and contains most of Lake Titicaca. Largely mountainous, its climate is cool, and it was formerly celebrated for the wealth of its silver mines. Mining and

stock-raising are the chief occupations. Pop. 537,300. Puno, the capital, stands on the W. shore of Lake Titicaca, at an alt. of 12,560 ft., 110 m. direct N.E. of Arequipa, with which it is connected by rly. Alpaca wool is exported. In the vicinity are gold, silver, and copper mines. Pop. 11,000.

Punshon, WILLIAM MORLEY (1824-81). British Methodist preacher. Born at Doncaster, May



Morley Punshon, Methodist preacher

29, 1824, he entered his grandfather's timber business at Hull, but became a local preacher in 1840, and Wesleyan minister at Whitehaven, 1845. He was a stirring preacher, and successfully held charges at Carlisle, Sheffield, Newcastle-upon-Tyne, and elsewhere, before proceeding to undertake duties in Canada, from 1868-73. He was made LL.D. at Coburg, Ontario, 1872. President of the Wesleyan Conference, 1874, he preached and lectured widely, and died at Brixton Hill, April 14, 1881. He published many of his sermons and addresses, a selection of which appeared in 1882.

Punt. Flat-bottomed boat, propelled by means of a pole. In the rules and regulations governing punt races it is defined as a flat-bottomed craft without stem, keel, or sternpost, and the width at each end must be at least one-half of the width at the widest part. Subject to these conditions a punt may be any width or length.

The original punt was a heavily built contrivance, used by Thames fishermen, and had a well for holding water towards the stern, in which the small fish used for bait were kept alive. From this has

been evolved the pleasure punt, and the long racing machine, often only 16 ins. wide.

The art of punting requires considerable practice and caution on the part of the novice. There are two styles of using the pole: the running method, and the more general one of pricking. In the former a few steps forward are taken each time the pole is pushed



Punting. 1. Position for taking stroke, in racing punt. 2. Putting in the pole. 3. Beginning of stroke. 4. Middle, and, 5, finish of stroke. 6. Recovering the pole

against the bed of the river; in the latter, a more or less stationary position is maintained. The pole should be put in the water well in front of the operator, and care is required in gathering it for the next stroke.

Punt or **Puoni**. Ancient name of a region southward of Egypt. Perhaps the biblical Put (Gen. 10), it is especially identifiable with the Somali coast. It was a chief source of incense, ivory, skins, ebony, ostrich feathers, and gold, and the predynastic overland trade developed into Red Sea voyages, inaugurated by Sahura, Vth dynasty. Of Queen Hatshepsut's expedition, about 1500 B.C., there are graphic sculptured reliefs at Deir el-Bahri. See Pile-dwellings.



Punt Gun, used for duck shooting

Punta Arenas (Span., Sandy Point). Seaport town of Chile, capital of Magallanes territory. It stands on the E. coast of Brunswick peninsula, in the Strait of Magellan, and is the most southerly town in the world. A coaling station and a port of call for ships

passing through the strait, it is a distributing centre for S. Patagonia, and the Falkland Islands, and is a wireless telegraphy station. In the vicinity are coal, copper, and gold mines. Considerable quantities of timber, wool, hides, frozen meat, and tallow are exported. Pop. 12,000.

Punta Arenas. Seaport town of Costa Rica, capital of the dept. of Punta Arenas. It stands on the E. coast of the sheltered Gulf of Nicoya, and is the Pacific terminus of the transcontinental rly. from Limón. It has a good harbour, and carries on a considerable trade in coffee and rubber. Pop. 4,700.

Punt Gun. Gun used in a punt for wild-duck shooting. The gun is sometimes made to turn on a swivel or pivot attached to the barrel; or a gun with a stock is supported on a crutch. The muzzle-loading types are the cheaper, but breech-loaders

are handier, and generally preferred. They are both single and double barrelled.

Pupa (Lat., doll). Chrysalis or resting stage in the life history of those insects which undergo a complete metamorphosis. During this stage the larval organism

undergoes great changes, and the features of the imago or perfect insect are developed. In a true pupa the animal is quies-



Pupa of, 1. Camberwell Beauty butterfly; 2. Death's Head moth



cent; in those cases where it is more or less active it is called a nymph. See Insect.

Pupienus Maximus, **MARCUS CLODIUS**. Roman emperor, A.D. 238. When the tyrant emperor Maximinus had been declared a public enemy by the senate, Pupienus was called to the throne, together with Balbinus (q.v.) as joint ruler. Pupienus took the field against Maximinus, whose army surrendered to him, Maximinus himself being killed by his own soldiers.

Balbinus and Pupienus, however, could not agree; their authority was defied, and they were both murdered in a revolt of the praetorian guard.

Pupil. Opening in the centre of the iris or coloured part of the eye. The iris is provided with muscular fibres by means of which the pupil can be dilated or contracted so as to regulate the amount of light which passes into the eye. In the presence of a strong light, or when gazing at a near object, the pupil contracts. Shading the eye, or gazing at a distant object, causes the pupil to dilate. Certain drugs called mydriatics, e.g. atropine, when dropped into the eye cause the pupil to dilate; others called myotics, e.g. physostigmine, cause it to contract. Paralysis of the nerves supplying the iris leads to partial or complete loss of its function, a result which is of value in the diagnosis of certain nervous diseases. The word (Lat. *pupilla*, little doll) apparently refers to the reflected image seen in the pupil; cf. the O.E. phrase "to look babies in the eyes." In another sense, the derivation, however, being the same, the word is used for one who learns from another. See Eye.

Puppet (obsolete Fr. *poupelle*, a little doll). Figure representing the character of a drama. They are moved by the performer or performers, who are generally concealed and carry on the dialogue, to which the movements are timed. Marionettes are an elaborate form of puppet show, in which the figures are moved by strings. In other forms, as Punch and Judy, the *guignol* of Lyons and the *burattini* of N. Italy, the figures are moved from below, generally by the hands of the operators concealed in the puppets' costumes. Puppets may be flat or round; their limbs are generally articulated, and sometimes moved by springs. The shadow play is a form of puppet show.

Known to the Greeks in the 5th century B.C., puppet plays are very popular in many Oriental countries, among the most elaborate being those of Java, where the figures, exquisitely designed, represent mythological beings. The performances, which last all night, take place before an illuminated screen, behind which the women sit, and thus see the drama as a shadow play; while the men, on the other side, see the puppets. In Japan, where distinguished dramatists wrote in the 18th century for the puppet play, the puppets are very large, and both operators and reciters are in full view. The Turkish puppet shows, in which

the protagonist is Karagyeuz (Black Eyes), are played in the fast of Ramadan. See Marionettes; Punch and Judy; Punchinello.

Puranas, THE. Scriptures on which Hinduism is based. The principal Puranas are 18 in number, and there are also 18 secondary ones or Upapuranas. Traditionally said to be the works of the compiler of the Vedas, they are of a later period, and, according to Elphinstone (History of India), were composed by different authors between the 8th and 16th centuries. They include accounts of the Creation, philosophical speculations, instructions for religious ceremonies, genealogies, fragments of history, and legends relating to the actions of gods, heroes, and sages. See India; consult also The Vishnu Purana, Eng. trans. H. H. Wilson, 1840; History of Sanscrit Literature, A. A. Macdonell, 1900.

Purandhar. Mt. in Bombay Presidency, in the Poona dist. It is 4,472 ft. alt. On one of its peaks, and also on the summit of the neighbouring but lower peak of Wazirgarh, are hill forts.

Purbach, PEUERBACH OR PEURBACH, GEORG (1423-61). Austrian mathematician and astronomer. Born at Peurbach, near Linz, May 30, 1423, he lectured at Italian universities, was astronomer to Ladislas of Hungary, 1454, and later professor of mathematics in Vienna, and died April 8, 1461. He compiled planetary tables, a list of fixed stars and a table of sines, and was a pioneer of decimal notation.

Purbeck, ISLE OF. Peninsula in the south-east of Dorset, England. Lying between the river Frome and Poole Harbour and the English Channel, it measures 12 m. in length and 8 m. in breadth, and is crossed from E. to W. by a range of chalk hills which rise to a height of 660 ft. Formerly a royal deer forest, the "island" is noted for its quarries of fresh-water limestone, known as Purbeck marble and used largely for paving. In the centre is Corfe Castle, and on the S.E. coast is Swanage. See Swanage, Its History, Resources, Botany, and Geology, etc., J. Brayne, 1890.

Purbeck Beds. In geology, name given to the rocks formed at the end of the Jurassic epoch. They are clays, limestones, shales, marls, and the so-called dirt beds. They are chiefly fresh-water deposits, though containing many marine fossils. In the Purbeck beds have been found remains of dinosaurs, crocodiles, plesiosaurs, shells of many fresh-water mollusca, etc. The Purbeck rocks are named from Purbeck, whence they extend uninterruptedly to Ayles-

bury, and appear scattered in other counties. The series is famous for Purbeck marbles, and for building and paving stones.

Purcell, HENRY (c. 1658-95). English composer. Born in London, he became a chorister at the Chapel



Henry Purcell,
English composer
After Closterman

Royal and a pupil of John Blow, whom he succeeded in 1680 as organist of Westminster Abbey, becoming in 1682 organist of the Chapel Royal as well. When young he revealed remarkable gifts for dramatic composition, and his first opera, Dido and Aeneas, was produced in 1675. He composed many other works for the stage, either in the form of incidental music or of complete operas, the most important being Dido and Aeneas, King Arthur, and The Fairy Queen.

His contributions to other departments of musical composition were hardly less important, and comprise church music, including some very fine anthems, secular songs and odes, as well as sonatas and lessons for strings and harpsichord. Taking into consideration the period when he lived and the stage of musical development reached at that time, Purcell is generally regarded as England's greatest composer. He died Nov. 21, 1695. See Lives, W. H. Cummings, 1881; J. F. Runciman, 1909.

Purchas, SAMUEL (c. 1575-1626). English author. Born at Thaxted, Essex, he graduated at

S. John's College, Cambridge, and taking orders, became curate of Purreleigh, Essex, in 1601, and vicar of Eastwood, 1604-13. From 1614-26 he was rector of S. Martin's, Ludgate Hill, London, and during this period, from many of Hakluyt's MSS., which he had inherited, he compiled Hakluytus Posthumus, or Purchas his Pilgrimes, containing a History of the World in Sea Voyages and Land-Trauels by Englishmen and others, 1625. He also wrote Purchas his Pilgrimage, or Relations of the World and the Religions observed in all Ages and Places, etc., 1613, 4th ed. 1626; Purchas his Pilgrim: Microcosmus, or the History of Man, 1619. Prom. Purkas.



Samuel Purchas,
English author

Purchase. Literally, to obtain by payment. In a special sense the word is used for the system by which commissions in the British army were bought and sold. The practice also prevailed in other armies. It was a survival of the time when offices of all kinds were bought and sold, a practice abolished in England in the 18th century. Promotion was also obtained or accelerated by payment, the safeguard against abuse being that the names of intending purchasers were laid before the sovereign for his approval. In Great Britain purchase never prevailed in the artillery or engineers.

In 1871 the proposal of the government to abolish purchase was bitterly opposed in the House of Lords, although £7,000,000 was provided as compensation. It was, therefore, ended by a royal warrant. In 1783 the regulation price for certain commissions was as follows: ensign of foot, £400; ensign of foot guards, £900; cornet of horse, £1,600. A lieutenant-colonel of infantry, who bought all his promotions, would pay £3,000 to the previous holders of the commissions.

Pure, SIMON. Character in Susannah Centlivre's play *A Bold Stroke for a Wife*. A Pennsylvanian Quaker, he comes to London with a letter of introduction to Obadiah Prim, an English Friend. Colonel Feignwell, who is in love with Prim's ward, an heiress, passes himself off as Simon Pure, whose credentials he has obtained. When the real Simon makes his appearance, Prim treats him as an impostor until he can prove his identity. From this character originated the phrase, "The real Simon Pure."

Purfleet. Village of Essex, England. It stands on the Thames, 16 m. E. of London on the Mid. (L.T. & S.) Rly. It has a small harbour, government powder magazines, and petroleum reservoirs. The Cornwall reformatory training ship is stationed here.

Purgative. Substance which promotes evacuation of the contents of the bowel. They are divided into: laxatives or drugs which act as mild stimulants to the muscular coat of the intestine, such as magnesia, olive oil, castor-oil in small doses, honey, figs, prunes, and other fruits; simple purgatives, which stimulate secretion as well as promote muscular movements, and are more powerful in their action than laxatives, the commoner simple purgatives being aloes, rhubarb, cascara sagrada, senna, and castor-oil; drastic purgatives, which strongly



Puri, India. The temple of Juggernaut, where the Hindu idol is kept

stimulate secretion and peristaltic movements of the intestine, such as calomel, podophyllin, scammony, colocynth, and croton oil; and saline purgatives, which largely increase the passage of fluid from the tissues into the intestine. Saline purgatives are the essential constituents of many purgative mineral waters.

Purgatory (Lat. *purgatorium*, that which cleanses). Theological term for a state of purification through which the souls of the redeemed who die before attaining perfection are held to pass. The doctrine was gradually developed, and is nowhere directly taught in the Bible (see Luke xxiii, 43), the texts adduced being capable of other interpretations. It is, however, implied in 2 Macc. xii, 41 ff. The allusions in the Fathers before S. Augustine are vague. S. Gregory the Great was the first to define the doctrine, A.D. 604. The Eastern Church has generally maintained the existence of a purgatorial state, though denying that it is accompanied by pains beyond the pangs of conscience. The Roman Catholic Church declares that, as death does not in itself cause sanctification, those who, although saved from eternal punishment, die without having made satisfaction for their sins by the fruits of repentance, require to be purified thereafter by punishments. The pains of purgatory, represented as purging fires, are graduated accordingly, and can be mitigated or shortened by the prayers and alms of the faithful, and especially by the Mass.

The council of Trent, while formulating the Roman Catholic doctrine of purgatory, denounced abuses and superstitions connected with it. The Reformers generally denied the doctrine altogether, as it conflicted with their teaching

on the Atonement and justification by faith. The Church of England, in the 22nd Article, condemns "the Romish doctrine concerning purgatory."

Among imaginative descriptions of purgatory by far the greatest is the second part of Dante's *Divine Comedy*. He represents it as an island in the Southern hemisphere, rising by seven stages, corresponding to the seven deadly sins, to the earthly paradise. See *Eschatology*; Heaven, Hell; Indulgence; Limbus.

Puri, JAGANNATH OR JUGGERNAUT. Dist. and town of Bihar and Orissa, India, in the Cuttack division. The dist. is situated on the Bay of Bengal, S. of the Mahanadi delta; it contains Lake Chilka. Rice is the chief crop. The town, standing on the coast, contains the shrine of Juggernaut (*g.v.*). Sometimes 250,000 people assemble for the annual Car festival. The temple is a magnificent building 800 years old. The town has become popular as a watering-place and health resort. The area of the district is 2,499 sq. m. Pop., dist., 1,023,000; town, 39,700. See Juggernaut.

Purification of the Blessed Virgin Mary. Festival observed by the Greek, Roman, Anglican, and other churches on Feb. 2. Alternatively called in the Prayer Book the Presentation of Christ in the Temple, it commemorates the ceremonial visit of Joseph, the Virgin, and the infant Christ to the Temple, recorded in Luke ii, 22-39. Lev. 12 prescribes the rites, including the offering of a lamb and pigeon, or two pigeons, which concluded the 40 days' ceremonial uncleanness of a woman after the birth of a male child. The Christian festival, recorded at Jerusalem about 450, was introduced in Rome by Pope Gelasius in 494, in place of the pagan Lupercalia. The English name Candlemas alludes to the words of Simeon, Luke ii, 32. See Mary.

Purim. Jewish festival celebrating the escape of the Jews from the plot of Haman (*g.v.*). Held on the 14 and 15 Adar, about a month before the Christian Easter, the festivities resemble those of Christmas, including present giving, feasting, and merrymaking, and the performance of religious plays. Formerly an effigy of Haman was carried in procession and finally hanged and burned.

Purine (Lat. *pus, puris*, pus). Fundamental compounds of the uric acid group of organic chemicals. It can be prepared by converting uric acid into trichloropurine by means of phosphorus



Puritans going to Church, each of the men, except the pastor, armed in case of attack by Indians or wild animals. A picture of life in the old Colonial days in New England

From the painting by G. H. Boughton, R.A., Public Library, New York

oxychloride, and this yields successively di-iodopurine and purine when treated with iodic acid and zinc dust. Purine has been prepared synthetically. Purine-like substances are known as the purine bases and include uric acid and xanthine, which are found in animal secretions.

Puritans. Name primarily applied in the 16th century to those advanced Protestants among the clergy who wished to purify the Church of England from what they regarded as superstitious and corrupt observances retained after the severance from Rome. From the clergy it spread to their supporters among the laity, and then was applied more particularly to the sectaries who stood outside the Church altogether. Generally, though not necessarily, their doctrines were Calvinistic.

Since the government of the Stuarts was especially repressive towards Puritanism, the parliamentary opposition to the crown found in them its strongest supporters, and they claimed to be the champions of religious liberty. Of Puritanism in its best signification Milton, Cromwell, and John Bunyan are the supreme types. The Puritans, however, included both tolerationists like Cromwell and men whose idea of religious liberty was liberty for themselves and the enforcement of their own opinions upon their neighbours. The harshness and rigidity of many of the doctrines most in favour with them, and in especial their view that it was the business of the state to supervise the personal morality of the citizens, caused a severe reaction against the Puritan pre-

dominance, and after the Stuart restoration in 1660 the name of Puritan was held up to derision by such satirists as Butler. The New England states were for many years a Puritan stronghold. See Calvinism; Nonconformity.

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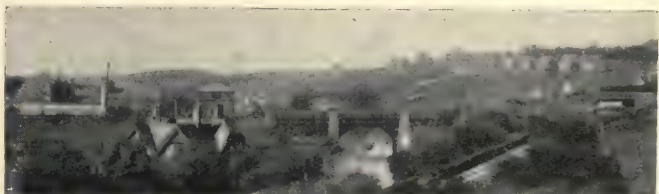
Purl. Hot alcoholic beverage. It is compounded of beer or ale, milk, spirits, sugar, and spice. The spirit may be gin, rum, or brandy; the milk may be omitted and ginger used, but the liquor must be brought almost to boiling point and the ingredients well mixed.

Purley. District of Surrey, England. It is 13 m. from London, of which it is a residential suburb,

roof (q.v.) along the latter's whole length. It serves to support any weight imposed upon the roof.

Purnea or **PURNIAH.** Dist. and town of Bihar and Orissa, India, in the Bhagalpur division. The dist. lies N. of the Ganges, S. of Nepal, and E. of the river Kosi. Only two-thirds of the area is cultivated. Paddy fields cover three-fifths of the tilled area. The town, on a branch rly. N. from Katihar, was formerly a Mahomedan capital. The area is 4,998 sq. m. Pop., dist., 1,990,000; town, 14,800.

Purple (Gr. *porphyra*, purple-fish). Colour intermediate between crimson and violet. In classical antiquity the word denoted the fast crimson dye resulting from the exposure to sunlight of a yellowish liquid secreted by whelk-like molluscs of the genera *Purpura* and *Murex*. It is chemically a dibromo-indigotin. Purple robes commanded high prices, and under the Roman emperors were limited to imperial use, hence the phrase born in the purple.



Purley, Surrey. The town seen from Riddlesdown, looking towards Russell Hill

with stations, Purley and Purley Oaks, on the L.B. & S.C. and S.E. & C. Rlys.

Purlin. In carpentry, a horizontal beam placed above and secured to the principal rafters of a

The dye was imported into ancient Egypt, and many biblical references illustrate its importance. It was also used for mural painting, ink, face-rouge, and for staining vellum inscribed in gold.

Purple Light. Phenomenon seen in the western sky after sunset. It is an arch-shaped glow of colour, varying from pink to violet, which appears in the western sky at a considerable altitude above the point at which the sun sinks below the horizon, and is due to diffraction of sunlight by tiny particles of different sizes in the atmosphere. *See* Diffraction.

Purple of Cassius. Purple precipitate formed by adding a solution of stannous and stannic chloride to a dilute solution of gold chloride. First prepared by Andreas Cassius of Hamburg, about 1683, his son of the same name published a pamphlet describing its properties. Much discussion has taken place as to the original composition of purple of Cassius, the modern view being that it is a mixture of colloidal gold and colloidal stannic acid. Its chief use is for preparing ruby glass.

Purple-wort OR MARSH CINQUEFOIL (*Comarum palustre*). Perennial herb of the natural order



Purple-wort. Foliage and flowers

Rosaceae, a native of Europe (including Britain), N. Asia, and N. America; it has a long woody rootstock, and tall stems of purple-brown tint. The leaves are divided into five or seven leaflets with toothed edges. The sparse flowers have short, dark purple-brown petals and larger sepals which are purple on the inner face. The rootstock is an astringent, and a yellow dye is obtained from it. It is also known as *Potentilla palustris*.

Purpura. Red or purple patches on the skin due to haemorrhage from the superficial blood-vessels. It is a symptom of a large number of diseases, including cerebro-spinal meningitis, smallpox, and scurvy, and may follow the administration of certain drugs; or may be associated with rheumatism.

Purpura. Genus of marine gastropods. *P. lapillus*, the dog whelk, sometimes called the dog winkie, swarms on the rocks around the British coasts, resembles in

form a small whelk, and has a whitish shell with spiral bandings. Chiefly found on the rocks between tide marks, it is carnivorous in habit, feeding mainly on mussels, and is destructive in oyster beds, drilling holes through the shell with its radula and extracting the inmate. It derives its scientific name from the fact that the secretion of a gland behind the head yields an indelible purple dye. *See* Gastropoda.

Purple. One of the tinctures in heraldry. It is represented in drawings by thin diagonal lines from sinister chief to dexter base. *See* Heraldry; Tincture.

Purree. Yellow pigment, much used in India for decorating houses. It is prepared from the urine of cows that have been fed on mango leaves.

Purse (Gr. *byrsa*, hide or skin). Small bag or receptacle, commonly one used for holding money. The privy purse is the name for the sum of money voted to the king for his personal expenses. Purse is also used for a sum of money collected for a gift, as when a presentation takes the form of a purse of gold. *See* Bourse; Bursar; Civil List.

Pursuer. Victualling officer of a warship in past days and predecessor of the modern accountant officer or paymaster of the navy. Liners and other trading vessels still carry pursers. *See* Paymaster.

Purslane (*Portulaca*). Genus of plants belonging to the order Portulacaceae (q.v.).

Pursuivant (Fr. *poursuivant*, attendant). Title of the junior officers of arms. Formerly they were the messengers and executive officers of the earl marshal's court, as well as the assistants and secretaries of the heralds. They derive their individual titles from honoured badges and other insignia. The pursuivants of the Heralds' College, or office of arms, are bluemantle, instituted by Edward III as an extra officer to the Order of the Garter; rouge croix in allusion to the cross of S. George; rouge dragon, and portcullis, both instituted by Henry VII, in allusion to the Welsh dragon of the Tudors and the Beaufort badge which had come to their house by alliance. Pursuivants, like the heralds, wear tabards. The Scottish pursuivants are named Unicorn, March, and Carrick, and the Irish officer, Athlone. *See* College of Arms; Herald; Tabard.

Purulia. Town of Bihar and Orissa, India, in Manbhum dist. It is the headquarters of the district and a railway junction. Pop. 20,900.

Purús. River of S. America, a tributary of the Amazon. Rising in La Montaña, E. Peru, it traverses Bolivia, flows N.E. into Brazil, and joins the Amazon through a large delta, about 120 m. above Manáos. Its length is estimated to be about 1,850 m. Sluggish and extraordinarily winding, it is navigable for steamers for 1,650 m.

Purveyance (Lat. *providere*, to provide). Right claimed by English and other kings to requisition, when travelling through the country, whatever was needed by themselves and their retinue in the way of provisions and services. This right, which appears to have been exercised from the earliest times, was naturally liable to great abuses. The grievance was dealt with in Magna Carta, and was the subject of much legislation from Edward I's time, but was not abolished until 1660. *See* Royal Household.

Pus. Collection of dead, white blood corpuscles, resulting from inflammation. *See* Inflammation; Suppuration.

Pusey, EDWARD BOUVERIE (1800-82). British divine. Born at Pusey, Berkshire, Aug. 22, 1800,



Edward Pusey,
British divine

he was a son of Jacob Bouverie, a son of the 1st Viscount Folkestone, who took the additional name of Pusey on succeeding to estates there. Educated at Eton and Christ Church, Oxford, Pusey became a fellow of Oriel College, was ordained, and studied at Göttingen. He made a reputation as a theologian, and in 1828 was elected professor of Hebrew at Oxford and canon of Christ Church.

Pusey gave much time to studying the usages of the Church in the past, and in a series of sermons laid down the principles on which the High Church movement was founded, while he contributed to Tracts for the Times. For a sermon, preached in Oxford, May 14, 1843, he was suspended from preaching for two years. However, the movement was widely successful, and from its inception Pusey was its acknowledged head, remaining its guide until his death in Oxford, Sept. 16, 1882. His writings include the Doctrine of the Real Presence, 1865. Pusey House, a theological centre in Oxford, is a memorial of his life and work. *See* Oxford Movement; consult also Life, H. P. Liddon, J. O. Johnston and R. J. Wilson, 1893-99; Life, G. W. E. Russell, 1907.

Push-Ball. Game invented by M. G. Crane, of Massachusetts, in 1894. It was introduced into Great Britain and played at the Crystal Palace, London, in 1902, but never became popular. There are two sides of 11 players each, divided into forwards, right wings, left wings, and goalkeeper. The goalposts are 18 ft. high and 20 ft. apart, with a crossbar at the height of 7 ft. from the ground. The ball used is 6 ft. in diameter, and weighs 50 lb. The playing area measures 140 yds. by 50 yds. Pushing the ball under the bar counts five points, and eight points are scored if it is thrown over the crossbar. A variety of push-ball has been played at military tournaments in London.

Pushkin, ALEXANDER SERGEYEVITCH (1799-1837). Russian poet. He was born at Pskov, May 26,



1799. His father was a member of an old noble family, and his mother a granddaughter of Abraham Petrovitch Hannibal, the negro favorite and godson of

Peter the Great. He was educated at the lyceum at Tsarskoye-Selo, and was early noted for his mastery of languages and his wide reading. His first poems were published when he was fifteen, and he entered the civil service in 1817.

In 1820 his fairy-tale poem, *Ruslan and Lyudmila*, gave him immediate fame, but in the same year he was banished to Bessarabia on account of some outspoken verses, circulated in MS. Visiting the Caucasus, he found inspiration for much fresh work, notably *The Prisoner of the Caucasus*, 1822. In 1824 an intercepted letter, in which he spoke slightly of religion, caused his banishment to his father's estate in the prov. of Pskov, and there for two years he wrote much of his best work, including a large part of the autobiographical poem, *Eugene Onegin*, and his great tragedy, *Boris Godunov*, 1825. In 1826 he was pardoned by the tsar and allowed to return to St. Petersburg. *Poltava*, 1828, was a fine narrative poem, including an account of Mazeppa, differing widely from that of Byron.

In 1831 Pushkin married Natalia Gontcharev, and in 1832 published the completed *Eugene Onegin*, Byronic in form but essentially Russian in spirit (Eng. trans.



Push-ball. A run by England in the England v. America match at Headingley, Aug. 23, 1902

H. Spalding, 1881). He was appointed historiographer to the crown, and wrote a *History of the Revolt of Pugachev*, 1833, and a short novel of the same period, *The Captain's Daughter*, 1836, translated into English in *Pushkin's Prose Tales*, by T. Kean, 1894. He was wounded in a duel, Jan. 27, 1837, and died two days later. During his short life Pushkin wrote much, despite a fondness for society and periods of dissipation; and with his great play, his narrative poems, his lyrics, epigrams, and tales he occupies one of the highest positions in Russian literature. See *Selections from the Poems of Pushkin*, translated by I. Panin, 1888; *Russian Poets and Poems*, N. Jarintzov, vol. i, 1917.

Pushthu or **PASHTU**. Language spoken by the Pathan peoples of the Indian North-West Frontier Province, Baluchistan, and Afghanistan E. of the Helmand. Spoken in India (1911) by 1,554,465, and outside British territory by a number estimated (1891) at 2,359,000, it is essentially Iranian, with an admixture of Indo-Aryan words. The N.E. or hard Pukhtu dialect of Peshawar is allied to sub-dialects in Buner, Swat, and Bajaur, and to those of the Yusufzai, Orakzai, Ghilzai, Mohmands, and Afridi. The S.W. or soft Pushthu dialect is also highly differentiated, in Bannu, Waziristan, and Kandahar. The literature, traceable back to the 15th century, embraces history and ballad poetry. See *Iranian*; *Pathan*.

Pussyfoot. Name given to the advocate of prohibition, W. E. Johnson. It is supposed to be due to his silent methods of tracking down offenders against the law, when he was engaged in suppressing the liquor trade in Indian territory. To-day those who advocate prohibition are sometimes called *Pussyfoots*. See *Johnson, W. E.*; *Prohibition*.

Pustule. Swelling of the skin containing pus or matter. See *Smallpox*.

Pusztas. Temperate grasslands of the Hungarian plains. Formerly almost entirely devoted to stock-rearing, the pusztas have now become one of the chief wheat-producing regions of Europe. Hungarian wheat and flour are among the finest in the world. Horse-

rearing is an occupation in the drier parts. See *Alföld*; *Steppe*.

Puteaux. Residential suburb of Paris, opposite the Bois de Boulogne. In the dept. of Seine, it stands on the left bank of the Seine about 6 m. W. of Paris, and has important calico and dye works and chemical factories. Pop. 32,000.

Putlog or **PUTLOCK.** Horizontal piece of timber inserted into holes in masonry for the purpose of supporting scaffolding (*q.v.*).

Putnam, GEORGE HAVEN (b. 1844). American author and publisher. Born in London, April 2, 1844, he was educated at Columbia grammar school, New York, the Sorbonne, Paris, and Göttingen University. He served in the 176th New York Cavalry



G. H. Putnam,
American publisher

during the Civil War, and was a prisoner at Libby and Danville, 1864-65. President of G. P. Putnam's Sons, publishers, he did much to promote the American copyright bill of 1891. His books include *Authors and Publishers*, 1883; *The Question of Copyright*, 1891; *Authors and Their Public in Ancient Times*, 1893; *Books and Their Makers in the Middle Ages*, 1896; *Abraham Lincoln*, 1909; and two volumes of *Memories*, 1914 and 1915.

Putney. London suburb. Situated on the Thames, S. of Fulham, and in the co. of Surrey, it forms part of the met. bor. of Wandsworth, is 6 m. from Waterloo on the L. & S.W. Rly., and has a station, East Putney, on the District Rly., and motor-bus and tramway connexion with the city and surrounding districts. The parish church of S. Mary, by the bridge,

has a 14th century tower, restored when the church was rebuilt in 1836, and a fine chantry, N. of the chancel, built by Bishop West in 1533. The bridge, by Sir J. W. Bazalette, 1886, replaced a wooden structure which, in 1729, superseded an ancient ferry. Putney is the headquarters of many rowing clubs, the starting-point of the Oxford and Cambridge boat-race, and has a public library, the gift of Sir George Newnes. The Royal Hospital for Incurables dates from 1854. On Putney Heath, which adjoins Wimbledon Common, are reservoirs of the Chelsea waterworks.

At Putney, called Putelei in Domesday, and included in the manor of Wimbledon, Harold had a fishery. Queen Elizabeth was a frequent visitor at Putney Palace, the residence near the river of John Lacy. In addition to Bishop West, notable residents have included Thomas Cromwell, Edward Gibbon, Mrs. Siddons, William Pitt, A. C. Swinburne, Theodore Watts-Dunton, Sir George Newnes, and J. Pierpont Morgan. Leigh Hunt, John Toland the Deist, and Fuseli the artist died here. Putney Heath, once notable as a duelling centre, had at one time, 1690-1750, the most famous bowling green near London. The obelisk, near to Bowling Green House, in which William Pitt died, commemorates the efforts of David Hartley in 1776 to introduce a method of building fireproof houses. Pop., 1876, 7,490; 1921, 28,240. See *The Old Houses of Putney*, E. C. Guthrie, 1870; *The Skirts of the Great City*, Mrs. Arthur Bell, 1907.



Putney, London. Old parish church of S. Mary. Top, right, Putney Bridge, from Putney

Putnik, RADOMIR (1847-1917). Serbian soldier. The son of a Serb of the banat of Temesvar,



Radomir Putnik, Serbian soldier

Hungary, who emigrated into Serbia and became a school-master at Kragujevatz, he was born in that town and educated at the military academy, Belgrade. With the rank of lieutenant-col. he took part in the Serbo-Bulgar War of 1885, and at the same time was chief of staff of the Danube division. From 1886-92 he was professor in the Serbian military academy.

Putnik's sympathy with the radical party in Serbia made him obnoxious to King Milan, and he lost his position, but he increased his reputation by the power of his military writings. When King Peter ascended the throne in 1903 he made him a general, and gave him command of a division. Putnik also acted for some time as minister of war. He was commander-in-chief of the Serbs during the First and Second Balkan Wars, 1912-13, and was appointed voivode, the Serbian equivalent for field-marshal. Putnik was the real generalissimo of the Serbians during the Great War,



from its outset until the overrunning of Serbia in Oct.-Nov., 1915, when he retreated with the remnants of the army across the mountains of Montenegro and Albania. At that time his health was so infirm that he had to be carried in a litter. He died May 17, 1917.

Putrefaction. Changes which occur in organic material after death. See Decomposition.

Puttee (Hindi *patti*, bandage). Long strip of cloth used as a leg covering. About three yards long and four inches wide, the puttee is wound spirally round the leg be-

tween knee and ankle, drawn tight and secured with tapes. First used in the Indian army, it has been adopted in the service uniform of many armies. For cavalry the put-



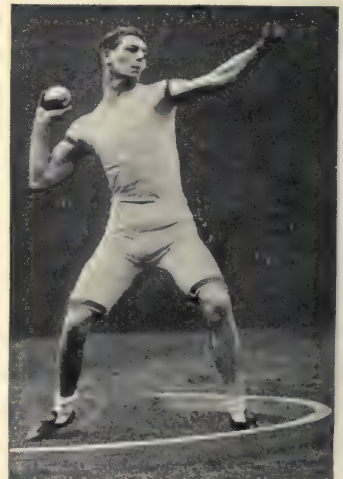
Puttee, as worn by infantry

tee is wound downwards, the tapes being secured at the ankle; for infantry it is wound upwards and tied below the knee.

Putter. Shortest golf club. Designed for use on the green, it has a straight face and is used to

propel the ball a distance of from 20 yards to an inch or less into the hole. Putters vary considerably in shape, from the putting cleek to those with a comparatively massive wooden or aluminium head. See Golf.

Putting the Weight OR SHOT. An event included in the programme of most athletic meetings. According to Amateur Athletic Association rules, a competitor must stand within a 7 ft. square to cast the shot or iron ball, which should weigh exactly 16 lb. The shot must be "put" by a fair push from the shoulder, not thrown. Length of the put is calculated from the front line of the square to the spot where the weight pitches. In America the putter stands within a 7 ft. circle, the rim of which is raised to prevent overstepping. The amateur world record was made by Ralph Rose at San Francisco, Aug. 21, 1909, with a put of 51 ft.



Putting the Weight. An American champion about to cast the shot

Puttkamer, ROBERT VIKTOR VON (1828-1900). Prussian statesman. Born at Frankfurt-on-Oder,



R. von Puttkamer,
Prussian statesman

May 5, 1828, he studied law at Heidelberg, Geneva, and Berlin, and entered the Prussian civil service. He became one of the leaders of the German Conservative party, and held a series of important offices, being minister of education, 1866-70; and minister of the interior and vice-president of the Prussian ministry, 1886. Disgraced by the emperor Frederick, he returned to power under William II, who made him president of Pomerania. He died at Karzin, Pomerania, March 15, 1900.

Putty. Plastic mixture of fine dry whiting or powdered chalk and linseed oil and usually white lead. It is used by glaziers for fixing window panes, and by painters for stopping nail holes and crevices and irregularities in woodwork.

Pu Tu OR POOTOO. Narrow island, lying $1\frac{1}{2}$ m. E. of Chusan Island in the China Sea. It is $3\frac{1}{2}$ m. long, and only half a mile wide at its narrowest part. The island is consecrated to the Bodhisattva Avalokiteçvara (Chinese, Kuan Yin) or goddess of mercy, the guardian deity of sailors. Pu Tu is one of the most celebrated centres of Buddhism, and is visited by thousands of pilgrims from China, Japan, and Korea. Its fame dates back to the 9th century, when a Japanese monk founded a temple here in 858.

Putumayo. Unorganized territory (commissary) and river of Colombia, S. America. It borders on Ecuador, and is in part claimed by that republic and Peru, but its boundaries are not yet defined. It is named from the river Putumayo or Igo, which traverses it. The capital is Mocoa. The river rises near Pasto in Colombia, flows E. by S., and unites with the Amazon near São Antonio. It is navigable for small craft for 700 m.

Putumayo Atrocities. Name given to a series of offences in the Putumayo district of Peru, near the Colombian frontier. In 1909 allegations were made by an English writer of gross ill-treatment of native labourers in rubber plantations owned by the Peruvian Amazon Company, a British company formed in 1907. After many denials from Peru, an official inquiry was made by Roger Casement

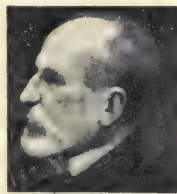
(*q.v.*) under British Government orders. His report (Cd. 6266), published in 1912, described the existence of systematic atrocities of a revolting kind, and joint action by Great Britain and the U.S.A. brought the punishment of some of the offenders by the Peruvian government.

Putz, HENRI GABRIEL (b. 1859). French soldier. He was born at Metz, Jan. 26, 1859, the son of General J. B. H. Putz (d. 1903), and was educated at Metz and in Paris. He entered the French army as a lieutenant of artillery in 1879, saw active service in Tunisia, 1881; Tonquin, 1885-87; Madagascar, 1896-99; and China, 1900-1; was promoted colonel in 1907, and general in 1911. At the outbreak of the Great War he commanded the 28th Infantry Division, and until 1915 took part in the operations in the Vosges. In June of that year he was placed in command of the 4th army corps. From Dec., 1917, to April, 1918, he was in command, under Pétain, of the French troops in the north of France. He became an inspector-general in Aug., 1918.



Henri G. Putz,
French soldier

Puvis de Chavannes, PIERRE (1824-98). French painter. Born at Lyons, Dec. 14, 1824, he was



P. Puvis de Chavannes,
French painter

educated as an engineer, but a visit to Italy determined him to adopt an art career. He studied under Henri Scheffer, a brother of Ary Scheffer, and Couture, but developed a wholly original decorative style of his own. No recognition was given him till 1861, when his two canvases, *War and Peace*, were bought by the state. After this he progressed rapidly. In 1876-77 he decorated the Panthéon (Paris) with paintings of the childhood of S. Geneviève, and in 1886-88 he completed his great Hemicycle of the Sorbonne. The Marseilles, Amiens, Rouen, and Lyons museums were all adorned with his flat-toned frescoes painted on canvas. He helped to found the New Salon in 1890, and became its president, 1891. He died in Paris, Oct. 24, 1898.

Puy de Dôme. Department of France. In the centre of the country, its area is 3,095 sq. m. It is a mountainous region, with many extinct volcanoes, the craters of which are rich in oil, lead, and granite. The chief rivers are the Allier, Cher, Dore, and Dordogne, and the highest peak is the Puy de Sancy (6,188 ft.). The Puy de Dôme itself is 4,800 ft. high. In the department fruit, rye, and potatoes are grown, and there are vineyards, its most fertile part being the plain of Limagne. The department has valuable coal mines and a number of mineral springs. Clermont-Ferrand is the capital. Before the Revolution the department was included in Auvergne, Bourbonnais, and Lyonnais. Pop. 535,000.

Puymorens Tunnel. Tunnel of the Pyrenees on the direct route between Toulouse and Barcelona. The Col de Puymorens, 6,295 ft., is on the watershed between the valley of the Ariège in France and that of the Segre in Spain. By an agreement between France and Spain, made in 1907, a rly. was to be constructed on this route; the most formidable engineering work was the cutting of the Puymorens Tunnel, which is perfectly straight, $3\frac{1}{2}$ m. long, $14\frac{1}{2}$ ft. wide, and 18 ft. high. The engineers, working S. from L'Hospitalet and N. from Porté, met on Dec. 24, 1914.



Puvis de Chavannes. S. Geneviève watching over Paris, one of the painter's best known works

Panthéon, Paris

Puzzle (Mid. Eng. *opposale*, question). Question or contrivance to perplex the mind. It may be a perplexing question, or an arrangement of letters or words, inviting solution (e.g. an acrostic, anagram, etc.), or a toy or device of wood, metal, or other material, which has some intricate way of being arranged, fastened, or unfastened. Examples of these last are the Chinese Tangram, one of the first of these contrivances to be called a puzzle, which consisted of a square piece of wood dissected into geometrical pieces that could be arranged so as to form an immense number of figures, and the Chinese rings linked on to a bar that had to be detached and replaced. Puzzle-walk is an alternative term for a maze (*q.v.*).

Puzzolana OR **POZZOLANA**. Mixture of silicates of volcanic origin. It was discovered near Pozzuoli (*q.v.*), and is employed, mixed with sand and slaked lime, as a cement.

Pwllheli. Mun. borough, seaport, and market town of Carnarvonshire, Wales. It stands on the N. side of Cardigan Bay, 21 m. from Carnarvon, and is served by the Cambrian Rly. It has a good harbour, is a centre of the lobster and oyster fisheries, and has a coasting trade. Lead, copper, and manganese are found in the neighbourhood. There are excellent sands and good bathing. Near the town much land has been reclaimed from the sea. Pwllheli, the name meaning the salt pool, became a borough in the 13th century. Market day, Wed. Pop. 3,800.

Pyæmia (Gr. *pyon*, pus; *haima*, blood). Form of blood poisoning in which micro-organisms in the circulation cause abscesses to appear in various parts of the body. See Blood Poisoning.

Pyapon. Dist. and town of Burma, in the Irawadi division. The dist. occupies the E. portion of the Irawadi delta. Rice is the sole crop. The town is situated some miles from the coast and the river channels. Area, 2,148 sq. m. Pop., dist., 256,000; town, 7,100.

Pyatigorsk. Town of Ciscaucasia, S. Russia. It is in the prov. of Terek, on the river Podkumok, and on a branch of the Vladikavkaz rly., and is famous for its sulphur springs. There is a Greek Catholic cathedral. Elburz, 60 m. distant, may be seen from the square. Pop. 32,000.

Pydna, **BATTLE OF**. Fought in 168 B.C., at the town of that name, in Macedonia, between the Romans under L. Aemilius Paulus, and a Greek army under Perseus, last king of Macedonia. The battle is memorable in military history for

the final triumph of the loose formation of the Roman legionaries armed with short swords over the phalanx (*q.v.*) of spearmen.

Pye, **HENRY JAMES** (1745–1813). British poet laureate. The son of Henry Pye, M.P., of Faringdon,



Henry Pye,
British poet laureate
After Drummond

Berkshire, he was born in London, Feb. 20, 1745, and educated at Magdalen College, Oxford. In 1766 he inherited his father's estate, but so heavily encumbered, that soon after his own election as M.P. for Berkshire, in 1784, he was obliged to sell it. He retired from Parliament in 1790, and in that year succeeded Warton as poet laureate, mainly as a reward for his loyalty to Pitt, for though he had a sincere love of letters, his poetry was dull and pedestrian to a degree. The appointment provoked general ridicule, but he retained it with complacency until his death at Pinner, Aug. 13, 1813.

Pye Corner OR **PIE CORNER**. London landmark, at the N. end of Giltspur Street, E.C. The name is said to have been derived from an inn. A small gilt figure of a fat boy on the corner house of Cock Lane perpetuates the legend that the Great Fire, which, while it was stopped at Cock Lane, continued to rage about Cripplegate 20 hours after Pye Corner had been razed, was due to the sin of gluttony. See Great Fire.

Pyelitis (Gr. *pyelos*, pelvis). Inflammation of the pelvis or inner part of the kidney. Most often due to a stone in the kidney, or extension of inflammation from the bladder, the symptoms are pain in the back, irritability of the bladder, blood or pus in the urine, and intermittent fever.

Pyeshkov, **ALEXEI MAXIMOVITCH** (b. 1869). Russian author, best known by his pen-name of Maxim Gorky (*q.v.*).

Pygmalion. In Greek mythology, king of Cyprus, who made a statue in ivory of a beautiful maiden. He was so charmed with his creation that he fell in love with the statue and prayed to the goddess Aphrodite to give it life. His request was granted and he married the maiden and had by her a son called Paphus. See Galatea.

Pygmalion. Drama by Bernard Shaw. It was produced April 11, 1914, at His Majesty's Theatre, London, where it had a run of 118 continuous performances. The

story deals with the efforts of Mr. Higgins, a professor of phonetics, to impart a diction and an accent worthy of a duchess to a Cockney flower-girl, named Eliza, and with his discomfiture. Beerbohm Tree played Higgins, Mrs. Patrick Campbell Eliza, and Edmund Gurney a dustman, Eliza's father.

Pygmalion and Galatea. Comedy by W. S. Gilbert. It was produced Dec. 9, 1871, at the Haymarket Theatre, London, and ran for 194 performances, W. H. Kendal playing the sculptor Pygmalion, and Mrs. Kendal Galatea, the statue come to life. The piece was revived at The Lyceum, Dec. 8, 1883, with J. H. Barnes and Mary Anderson in the title-roles, again in 1888 and at The Comedy, in 1900.

Pygmy. Name applied to diminutive peoples. Derived from the Gr. *pygmæ*, the measurement of the forearm and the closed fist, the term was used by Homer and Herodotus for fabled races in Ethiopia and India. It now denotes the dwarf tribes encountered by Schweinfurth, du Chaillu, Stanley, and others in equatorial Africa, and the negritos of S.E. Asia. See Dwarf Races; Giant; Negrito.

Pyjamas. Form of nightwear consisting of a loose jacket and trousers. The word is Anglicised from the Persian *pa'ejama*, lit. leg clothing, trousers, fastened by a string or cummerbund.

Pyknometer OR **PYCNOMETER**. Specific gravity bottle or vessel by which the specific gravity of a liquid is determined. This is done by weighing separately a certain volume of distilled water and an equal volume of the liquid under examination, and comparing the two weights. The specific gravity is expressed by the weight of a given volume of the sample liquid divided by the weight of an equal volume of distilled water.

Pyralædes. In Greek mythology, the devoted friend of Orestes, who gave him his sister Electra in marriage. The friendship of Orestes and Pyralædes is proverbial.

Pylon (Gr., gateway). Massive temple-portal in ancient Egypt. Developed at Thebes (XVIIIth dyn.), it usually comprised a monolithic lintel, corniced, on lofty jambs, and flanked by two truncated pyramidal towers, with sculptured hieroglyphs. Vertical grooves held poles for coloured streamers on feast-days. The approach was between royal statues, often colossal, and a pair of obelisks. A notable example, Edfu, is 250 ft. wide, and 115 ft. high. At Karnak (*q.v.*), five successive pylons were added to the Great Temple of Senusert I in subsequent reigns.

Pylon. In aeronautics, an arrangement of struts for the support of certain bracing wires in an



Pylon of an aeroplane, indicated at A

aeroplane (*q.v.*). The term is used for the support for the upper bracing wires of a monoplane wing, and for similar wires bracing an overhanging top wing on biplanes. The pylon bracing or structure on aeroplane wings is necessary when the machine has landed, in order to support the weight of the wings. Otherwise the latter would collapse unless specially strengthened spars were provided, as is sometimes the case. It is also the name given to the towers used on an aerodrome to mark the course for aeroplane races.

Pylorus (Gr. *pylē*, gate; *ouros*, warder). Distal or intestinal aperture of the stomach. It is surrounded by a ring of muscular fibre which, following a meal, is in a state of contraction, thus retaining the food in the stomach for the process of digestion. At varying intervals the muscular fibres relax, and food is permitted to pass onwards into the intestine for further digestion.

Pylos. Town in the S.W. of Messenia, ancient Greece, about 60 m. from Sparta. In legendary times the venerable Nestor, of the Homeric poem, was its king. In 425 B.C. it was seized by the Athenians in the Peloponnesian War, while in the adjacent Bay of Navarino the Turkish fleet was defeated by the allied fleets of the British, French, and Russians in

1827, a victory which secured the independence of Greece. The modern Pylos or Navarino (*q.v.*) stands at the S. end of the bay.

Pym, JOHN (1584–1643). English statesman. He was born at Brymore, Somerset, and educated at Pembroke College (then Broadgates Hall), Oxford, afterwards becoming a student at the Inner Temple, though he was never called to the bar. In 1614 he became member of Parliament for Calne, and in 1625 member for Tavistock. Already a prominent member of the parliamentary party that was coming into conflict with the crown, he was one of the



John Pym.
English statesman

Pym was in effect the leader of the Short Parliament of 1640, took a principal part in the impeachment of his whilom friend Strafford in that year, and had a share in the Grand Remonstrance of 1641, when he first put forward the pro-

posal to check the royal power by making ministers responsible to Parliament. He was one of the five members (*q.v.*). Pym died Dec. 8, 1643, having been made master of the ordinance a month earlier. See *Statesmen of the Commonwealth*, J. Forster, 1840.

Pyorrhoea. Disease of the tissue surrounding the necks of the teeth. In the nature of a reaction against an external irritant (tartar and micro-organisms), its characteristic symptom is the exudation of matter from the gums around the necks of the teeth. Associated with this the gums are inflamed, the bony socket is softened, and the teeth become loose, eventually falling out if the disease continues sufficiently long.

The disease commences at the gum margins, which become red and swollen. At a later but variable stage the gum loses its connexion with the root of the tooth towards the neck, and exudation of matter starts from the part of the gum which has become separated from the roots. Covering the part of the teeth from which the gum has separated, there is a coating of tartar which gradually tends to form farther down the root of the tooth, and thus progressively to deepen the trough between the gum and the root. Together with these changes the destruction and absorption of the bony socket are progressive.

The cause of pyorrhoea is lack of cleanliness at the necks of the teeth, which is induced by stagnation, predisposed to by lack of function. This lack of function may arise either from the habitual consumption of foods which do not stimulate efficient mastication and the self-cleansing processes of the mouth, or because opposing teeth are absent.

As the teeth are normally coated with mucus, and as this mucus is liable to become impregnated with lime salts if it stagnates continually at the necks of the teeth, it is of special importance to eat food of such a nature as will disintegrate this mucus, before it has adhered to the necks of the teeth sufficiently long to favour the deposition of tartar. The foods which precipitate



Pygmy. Left, group of pygmy dancers with two Bantu women of normal height; right, family of the Mambuti tribe, from the Albert Nyanza. Inset, head of a pygmy woman



Pyramids. Diagram indicating the arrangement of the chambers, passages, and air channels in the Great Pyramid

and disorganize mucus in such a way as to facilitate its removal are of an acid nature, such as vegetables and fruits. Artificial methods which help to prevent pyorrhoea are of a similar nature, that is to say, rubbing or brushing the gums, and the use of a slightly acid mouth-wash. See *Dentistry; Teeth*; consult also *Chronic General Periodontitis*, J. F. Colyer, 1916.

Pyramid. In geometry, a polyhedron, one of whose faces, the base, is a figure of three or more sides, i.e. polygon, and the others triangles. The latter meet at a point, the vertex of the pyramid. When the base is a regular polygon and the vertex is on the perpendicular to the base from its centre point, the pyramid is called a regular pyramid.

Pyramids. Monumental structures on a polygonal base, usually square, with triangular sides, generally in one plane, sloping to an apex. The word is the grecoised form of an Egyptian term. Conjectured at various times to be

astronomical observatories, standards of measurement, treasure-houses, and even Joseph's granaries, these monuments, originated in early dynastic Egypt, are simply gigantic tombs, each pyramid designed for a single interment.

About 75 examples remain in the necropolis field of Memphis, on the left bank of the Nile between Abu Roash and Dahshur. They stand on the desert edge just beyond the cultivated alluvium, above high-Nile. The design emerged from the mastaba-tomb, and a transitional form occurs in the step-pyramid at Sakkara, erected by Tcheser of the IIIrd dynasty. This comprised a limestone mastaba, periodically enlarged until it became a quadrangular turret in seven diminishing stages.

At the end of the IIIrd dynasty Seneferu, when erecting at Medum a similar structure, formulated the pyramid type by adding casing blocks to impart continuous slope to the sides, and removing the funerary chapel to the outside.

The present step-like appearance of this pyramid results from the demolition of the casing. The original height was proportioned to the circuit of the base as the radius of a circle to its circumference, the dimensions being 7 and 44 times a unit of 25 cubits. This made the angle of slope in the finished pyramids 50° to 55°, whereas in its present uncased form Medum has reverted to 75°, the normal angle of slope of mastaba-tombs.

Seneferu's successor Khufu (Cheops) produced the great pyramid of Gizeh, the only one of the "seven wonders of the world" still extant, and the most stupendous work of human hands. The proportions repeated those of Medum, the unit being lengthened to 40 cubits. This gave a height of 481 ft., a base line of 775 ft., and a volume of 88,500,000 cub. ft. of masonry, weighing 6,840,000 tons. It comprised 2,300,000 blocks averaging 2½ tons apiece, piled in 210 horizontal courses upon 12½ acres. The disappearance of the casing blocks enables modern tourists to clamber over the 3 ft. courses to the truncated summit. The entrance, 48 ft. up the N. face, was sealed by a block protecting a system of passages to three main chambers. From the entrance a passage descends to an unfinished chamber 101½ ft. below the plateau level. This was abandoned, and an ascending passage formed at 60 ft. from the entrance. Thence a horizontal gallery diverged to the so-called queen's chamber, perhaps utilised for the statue of the king. The upward ascent, enlarged into a grand gallery, leads to the king's chamber, containing a granite sarcophagus, now lidless. This chamber was lined and roofed with massive granite blocks, floated downstream from Assuan.

Herodotus and Diodorus described the reputed methods pursued by the pyramid-builders. Khufu was computed to have employed 100,000 men during the



Pyramids. Sectional views of the Second and Third Pyramids of Gizeh, showing the extent of the excavations and the portion removed in the attempt to reach the sepulchral chamber of the Third Pyramid



1. Great Pyramid, of Cheops, and the Sphinx, from the S.E. 2. Entrance to the Great Pyramid, 48 ft. from the ground on the N. side. 3. Second pyramid, of Khafra, showing the remaining incrustation of limestone slabs

on the upper courses. 4. N.E. corner of the Great Pyramid, where the ascent is usually made. 5. Third pyramid, of Menkaura. 6. Main passage which leads to the sepulchral chamber of Cheops, in the Great Pyramid

PYRAMIDS: SEPULCHRAL MONUMENTS OF THE ANCIENT EGYPTIAN KINGS



Pyramids of Gizeh, from the south. Behind the three small pyramids stands the Third Pyramid, on its right the Second, and beyond that the Great Pyramid

three months of the inundation for 20 years. Traces remain of the quarry road over which the limestone blocks were hauled from Tura, 9 m. away, and then poised in position over temporary earthen ramps. The stonemasons and masons, doubtless employed all the year round, used saws up to 9 ft. long, and for hollowing out the sarcophagi tubular drills, all with fixed cutting points.

The second Gizeh pyramid, erected by Khafra, was 454 ft. high, with a base of 708 ft., and two tomb-chambers on or below ground level. The third, Menkaure's, was 219 ft. high, with a base of 356 ft. Menkaure also set up a brick pyramid at Dahshur. At Abusir and Sakkara stand the pyramids of Vth and VIth dynasty kings. Those of Unas and his immediate successors at Sakkara bear upon their chamber walls hieroglyphic inscriptions, the so-called "pyramid texts" which were embodied in the Theban Book of the Dead. These Old Kingdom sepulchres were imitated during the XIIth dynasty, mostly with cores of air-dried brick, at Lisht, Dahshur, Illahun, and Hawara, near or within the Fayum.

Much controversy has arisen over the manner of planning the dimensions of these monuments. Lepsius argued that each king began his reign with a nucleus plan, regularly enlarged as the reign lengthened. Petrie regards such a method as disproved by the position of the galleries. A view

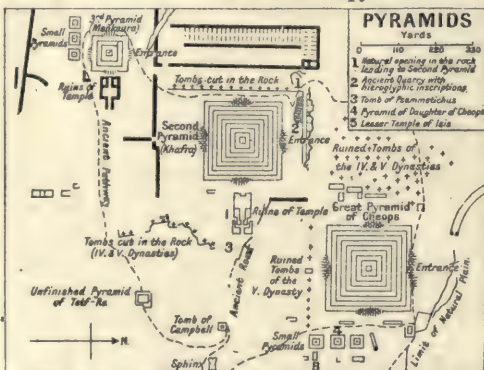
much favoured is that most pyramids were planned in a moderate size, and never altered, but that the multiple chambers in the three largest examples point to plan-revision, once or twice only, during the reigns of their builders.

Pyramidal tombs, about 30 ft. high, were erected over the remains of nobles and high officials. Pyramids form part of some XIth dynasty structures at Thebes, but never as independent sepulchres. Monolithic memorials of New Empire priests and judges assumed the form of miniature pyramids, with scenic reliefs. During the New Empire the pyramidal form was simulated in Nubia by chambered sepulchres above ground, usually with porticoes, steep-pitched sides, and flattened tops. Numerous near Gebel Barkal, the

ancient Napata, they nowhere exceed 60 ft. in height. At Meroë there are about 200, including those of Candacë queens down to the 2nd century A.D.

The Egyptian pyramid-tomb was never naturalized by the nations around. The geometrical form influenced Phœnician architecture, and became fashionable in Augustan Rome, as in the marble-faced concrete pyramid of Cestius, 116 ft. high, within the Aurelian wall. Earthen tumuli and stone cairns, raised in many parts of the world, with roundish outlines, are related only remotely to the Egyptian form of four plane faces sloping to an apex. This quadrangular shape marks some pyramidal mounds of early Chinese emperors. Prehistoric truncated pyramids also occur in Tonga,

Tahiti, and other Pacific islands, and became characteristic of the advanced Maya and Toltec architecture of pre-Columbian America. See Dongola: Egypt; Mastaba; Teocalli; consult also Pyramids and Temples of Gizeh, W. M. F. Petrie, 1883; The Nile, E. A. Budge, 10th ed. 1907. Egypt, K. Baedeker (Eng. trans.) 7th ed. 1914.



Pyramids. Plan showing the relative positions of the Pyramids of Gizeh and the adjacent ruins



Pyramids. Reconstruction of the Pyramids of Abusir as they were built by the kings of the Vth dynasty, c. 3500 B.C.
Based upon the beautiful reconstruction by Herr Borchardt, the German Egyptologist, in his "Grabdenkmal des Königs Ne-user-ra"

Pyramids. Game played on a billiard-table. Fifteen coloured balls are arranged in the form of a compact pyramid, or triangle, the ball forming the apex of the triangle resting on a spot, called the pyramid spot, midway between the centre spot and the billiard spot on the table, and the base of the triangle towards the top cushion. The game is usually played by two persons, although sides of any convenient number can be formed, who use a sixteenth white ball alternately. The game consists entirely of winning hazards, the object being to pocket more of the coloured balls than one's opponent.

The order of play having been determined, A plays from the D at the coloured balls. If he pockets one or more he continues his innings, playing from where the white ball stops until failure occurs, when it is B's turn to proceed. Should a player pocket the white ball one point is deducted from his score, and a coloured ball previously pocketed is placed on the pyramid spot, or, if that is occupied, as near to it in a straight line from the top cushion as possible. If the striker who runs in, i.e. pockets or loses the white, has not previously scored a red ball, he is said to owe one, and the next ball he takes is replaced on the table, the stroke not counting to him, except that his penalty is nullified. When all the coloured balls but one have been pocketed, the white is used by the first striker as the cue ball,

and the coloured one by his opponent. Should either player then run in a pocket, or give a miss, it counts to his opponent, and the game is over.

As played by leading professionals it gave great scope for skill. Their method, usually, was to pay very little attention to scoring during the early stages of the game, but to manoeuvre until an opportunity presented itself of taking several balls in an innings. In this connexion it is recorded that in a private match the late William Cook and the (then) younger Roberts played for two hours, at the end of which period both were owing three balls. There was once a professional pyramid championship. The last time it was contested was at the Guildhall Tavern, London, in March, 1875, when the late W. Cook defeated D. Richards. See Billiards; Snooker.

Pyramids, BATTLE OF THE. Battle fought near Embabeh, Egypt, in which Napoleon Bonaparte defeated the Mamelukes under Murad Bey, July 21, 1798. The Egyptian forces, totalling about 37,000, were drawn up between the Nile and the Pyramids of Gizeh, with a smaller force of 1,000 Mamelukes under Ibrahim on the further river-bank. Soon after dawn Bonaparte's five divisions, in square formation, advanced. In spite of a furious Mameluke charge against Desaix's division, the French routed their enemy, captured Embabeh, and

drove its defenders into the river. Many escaped by swimming, but over 1,000 were drowned and 600 killed. The French losses were light, and two days later Bonaparte entered Cairo. Before this battle Bonaparte, addressing his troops, is believed to have used the famous phrase, "Soldiers, remember that from these Pyramids forty centuries look down upon you!" See Egypt: History.

Pyramus. In Babylonian legend, a youth who loved a maiden named Thisbe, and, their parents refusing consent, used to talk with her through a chink in a wall. Having resolved to marry, the pair agreed to meet under a mulberry bush by the tomb of Ninus, and flee together. Thisbe reached the rendezvous first, but was frightened away by a lion. Pyramus then arrived, and finding a veil which Thisbe had dropped, stained by contact with the lion's gory jaws, concluded that she had fallen a victim to the brute, and killed himself with his own hand. Thisbe, returning to find Pyramus dead, killed herself also. In memory of the tragedy the fruit of the mulberry was red ever afterwards. The story is told by Ovid in his *Metamorphoses*, and is made use of by Shakespeare in *A Midsummer Night's Dream*.

Pyrarygryte (Gr. *pyr*, fire; *argyros*, silver). In mineralogy, a sulph-antimonite of silver. Dark red to black in colour, it is one of the valuable silver ores. See Silver.



Pyrenees. La Cirque de Gavarnie, a water-worn valley or gully on the French side of the mountains

Pyrazole. Organic chemical with a carbon-nitrogen ring formation, the simplest synthesis of which is carried out by combining acetylene with diazomethane. Pyrazole is a weak base of great stability. From it are derived pyrazoline and pyrazolidine, the latter being the group to which belongs antipyrine or phenyldimethylpyrazolone. The yellow dye-stuff tartrazine is a pyrazolone.

Pyrene. Hydrocarbon obtained by the destructive distillation of coal and wood, and as a by-product in the smelting of mercury ores. It is a white crystalline body which forms a characteristic picrate, crystallising in long, lustrous red needles.

Pyrenees (Fr. *Pyénées*; Sp. *Pirineos*). Mountain range of S.W. Europe, dividing France from Spain. Extending from Cabo de Créus on the Mediterranean to Fuenterabia on the Bay of Biscay, its length is 270 m. and breadth between 25 m. and 90 m. The W. continuation of the mt. system which trends almost due W. along the Biscayan borders of Spain is known as the Cantabrian Mts.

The highest point of the Pyrenees proper reaches an alt. of 11,168 ft. in Mt. Aneto or Pic de Néthou. The mean height is only 3,930 ft. for the whole range; the highest peaks are not on the axis, but rise from great transverse ridges, which, with the numerous valleys running at right angles to the chain, constitute one of its chief features. The line of perpetual snow is high, ranging from 8,800 ft. on the N. side to 9,200 ft. on the S. Another peculiarity is the great, deep, water-worn gullies, called cirques (Sp. *ollas*, pots), such as the

Cirque de Gavarnie (*q.v.*). Towards the Atlantic the average alt. decreases, and by the shores both of the Bay of Biscay and of the Mediterranean a low, fairly level tract admits of easy passage between France and the peninsula.

The Pyrenean chain is sometimes divided into three sections: the Central Pyrenees between the Pic des Escaliers and the Col de la Perche, and the Western and Eastern Pyrenees, lying either side of these points. Most of the highest peaks are found in the central section. Next to the Maladetta or Pic de Néthou (*q.v.*), the loftiest crests are the Pic des Possets (11,047 ft.), Monte Perdido (10,997 ft.), Vignemale (10,794 ft.), Marboré (10,673 ft.), Pic du Midi (9,466 ft.), and Canigou (9,137 ft.). Apart from the high-roads and rlys. from Bayonne to San Sebastian, and from Perpignan to Figueras, there are only two carriageways across the Pyrenees, though there are some fifty footways. The oldest pass, on the Roman road from Saragossa to Oloron, is the Col de Somport, via Jaca and Canfranc; the other, the Col de la Perche, leads from Villefranche to the Segre valley. One of the most frequented is that from St. Jean de Pied de Fort to Pampeluna. The pass from Perpignan to Figueras was traversed by Hannibal in 218 B.C. An international rly. line is being constructed through the tunnel of Canfranc.

Mainly of granite formation, there are signs of volcanic upheaval, and there are strata of Silurian deposits and Cretaceous limestones of the Eocene period. Copper, silver, lead, coal, lignite, and iron are found. The mines of

the Pyrenees were known to the Carthaginians and Romans, and several are still worked. Thermal and mineral springs abound. Noted resorts close to or on the mountains are Gavarnie, Pau, Canterets, Tarbes, Lourdes, Bagnères-de-Bigorre, Luz, and Bagnères-de-Luchon. A number of rivers have their source in the Pyrenees, the chief of which are the Aude, Garonne, and the Adour on the N., and the Aragon, Segre, Llobregat, and the Noguera on the S. There are many forests, of fir, pine, box, and, on the lower slopes, evergreen oaks. Plants grow up to a line some 500 ft. higher than in the Alps. Wild animals include the bear, lynx, wild cat, chamois, wolf, boar, deer, and ibex. Generally speaking, the Franco-Spanish frontier coincides with the line of the highest peaks. The tiny republic of Andorra (*q.v.*) lies within the range. See *Histoire des Peuples et des États Pyrénéens*, J. E. M. Cénac-Moncart, 1860; *Book of the Pyrenees*, S. Baring-Gould, 1907; *The Pyrenees*, H. Belloc, 1909.

Pyrenees, PEACE OF THE. Treaty signed in Nov., 1659, between France and Spain. The treaty of Westphalia had put an end to the European war except as regards hostilities between these two countries, and in 1659 Mazarin met the Spanish minister on the Isle of Pheasants in the Bidassoa, just beneath the Pyrenees.

The treaty signed there provided for mutual restorations of territory, but its main advantages were secured by France, who obtained Artois and a number of fortresses in Flanders and Luxemburg, thus strengthening her N.E. frontier. Ypres, Furnes, and some other places were, however, returned to Spain. France gave up Lorraine to its exiled duke, but retained his other duchy of Bar and several other concessions in this eastern area. As Roussillon was ceded to France the Pyrenees became the boundary between the two countries. In Italy, France surrendered all her conquests in Lombardy and Savoy, except only Pinerole. See France: History.

Pyrénées-Orientales. Southern dept. of France. Its area is 1,598 sq. m. Bounded S. by Spain and E. by the Mediterranean, its chief rivers are the Ariège, Aude, Tet, Tech, and Agly, and it includes Mont Canigou (9,137 ft.), the most easterly peak of the Pyrenees. There are several lakes, the most important being the Étang de Leucate. Iron, copper, lead, and granite are mined, choice fruits are grown, and the vines yield red and muscatel wine. Perpignan is

the capital. Before the Revolution the department was partly in Roussillon and partly in Languedoc. Pop. 210,000.

Pyrenomycetaceae. Suborder of fungi, of the natural order Ascomycetes, in which the spore-bearing surface is contained in flask-shaped bodies embedded in the external surface, and opening when the spores are mature. Some of the species are black, hard, and woody. Others, like the Truffles (*Tuber*) and Hart-truffles (*Elaphomyces*), are fleshy and grow underground. See Hart-truffle; Truffle; Tubercaceae.

Pyrethrum. Garden name for several species of *Chrysanthemum*, especially the gold feather (*C. praecox*). A native of the Caucasus, it was introduced to Britain in 1804. It is a perennial herb, about 2 ft. high, with aromatic yellow leaves cut into incised lobes, and daisy-like white flowers with yellow centres. It is largely used for carpet bedding and edgings, and is grown, therefore, as an annual to obtain small plants, which are frequently nipped to keep them dwarf and prevent flowering. After flowering the plant turns green. See *Chrysanthemum*.

Pyrgi. Ancient port of Etruria, Italy. It stands on the Tyrrhenian Sea, 9 m. S.E. of Civitá Vecchia, and was the port of Caere (*q.v.*) of prehistoric origin. Scanty ruins of its walls are still extant. It was sacked by Dionysius, tyrant of Syracuse, in 384 B.C., and afterwards became subject to Caere. Colonised by Rome about 192 B.C., it became a summer resort for opulent Romans.

Pyrgos. Town of Greece. Situated on the N. of the Gulf of Arcadia, W. Morea, it is about 50 m. S.W. of Patras, with which it is connected by rail. The local products, currants, grapes, and oranges, are exported through Katakolon by rly. 12 m. E. are the ruins of Olympia. Pop. 14,000.

Pyrheliometer. Instrument for measuring the radiation of heat from the sun. In a typical instrument two blackened strips, the first of which is to receive the heat of the sun, and the second of which is heated electrically, are placed side by side. They are connected by a detached electric thermo-couple,



Pyrheliometer for measuring radiation of heat from the sun

which records when the two strips are of the same temperature. The amount of heating given to the second strip can be precisely estimated, so that the amount received by the first strip from the sun becomes known. See Sun.

Pyridine. Hydrocarbon formed by the destructive distillation of bones. The tarry matter known as Dippel's oil, which is obtained when bones are distilled, contains pyridine, this base with others being separated by shaking the oil with sulphuric acid to form sulphates, decanting, and adding alkali to obtain the free bases. Pyridine in the crude state is employed on the Continent as a denaturant for alcohol, on account of its persistent, disagreeable taste. Pure



Pyrenomycetaceae. Candle-snuff fungus (*Xylaria hypoxylon*) growing on an old stump

pyridine is used in asthma in doses of from two to ten drops, and also as an inhalation.

Pyrites. Disulphide of iron, FeS_2 . Brass-yellow in colour, with a metallic lustre, it is very widely distributed, being found in practically every period of geological time, either disseminated throughout a rock, as concretionary masses, in veins, as lenticular masses, or forming a layer between two different types of rocks. When heated in air it yields sulphur dioxide and ferric oxide, a fact made use of in the preparation of sulphuric acid. The mineral usually contains impurities, often valuable, as gold and silver and copper. Pyrites is also used in the manufacture of red paints, and varieties are cut and polished as gem stones.

The word pyrites is occasionally used for other minerals, as copper pyrites or chalcopyrite, one of the chief ores of copper; magnetic pyrites, FeS , and arsenical pyrites, FeSAs . See Iron; Mineralog.

Pyrmont. Town of Germany. It is 32 m. S.W. of Hanover, and is the capital of the little state of Waldeck-Pyrmont. Picturesquely situated in a wooded valley at

the foot of the hill called the Bomberg, it is celebrated for its mineral springs, which have been used since the 16th century. The chief buildings are the Kurhaus, theatre, and the palace, which until 1918 was the residence of the rulers of Waldeck-Pyrmont.

Pyrocatechin. A phenol first obtained by the dry distillation of catechin. It is also known as catechol and brencatechin. Pyrocatechin is best obtained from guaiacol, separated from beechwood-tar creosote by passing through it a current of gaseous hydriodic acid, and then separating the catechol by fractional distillation. Pyrocatechol is used as a photographic developer, and is also an ingredient of kachin.

Pyrocollodion. Variety of nitrocellulose smokeless powder. Mendeléev, working on behalf of the Russian government, was able between 1891 and 1895 to produce nitrocellulose containing 12.44 p.c. of nitrogen which was completely soluble, and this product contains sufficient oxygen to convert the whole of the carbon to carbon monoxide and the hydrogen to water. This nitrocellulose was termed pyrocollodion. See Collodion Cotton; Explosives; Gun-cotton; Nitrocellulose; Poudre B; Smokeless Powder.

Pyrogallol. A phenol, commonly known as pyrogallie acid, or pyro, and much employed as a photographic developer. It is prepared by heating gallic acid in an autoclave or bronze digester, fitted with a means for allowing the carbon dioxide to escape. The resulting solution of pyrogallol is boiled with animal charcoal, filtered, evaporated, and allowed to crystallise. Pyrogallol occurs in two forms, one being a light-weighting white powder, and the other a heavier product. The photographic developing properties of pyrogallol were discovered by Maddox in 1871.

Pyrography (Gr. *pyr*, fire; *graphein*, to write). Art of burning a design on wood, leather, or other substances. The design is burnt on in a number of ways, the simplest being by means of heated metal skewers, but this is laborious, and has been replaced by electrical and other methods. One of the best is a hollow needle heated over a spirit lamp, and kept hot by forcing through it a jet of burning vaporised benzine. The needle is used exactly like a pencil, and burns lines on the surface of varying depth according to the temperature, which can be regulated, generated by the benzine. Repeated designs are often burnt by means

of metal dies or brands, while the burnt designs are often embellished by carving and painting. An alternative name is poker-work, from the metal skewers once used. See *Poker-work*: consult also *Pyrography* and *Wood Roasting*, T. Bolas and C. G. Leland, 1900; *Pyrography*, M. Maude, 1901.

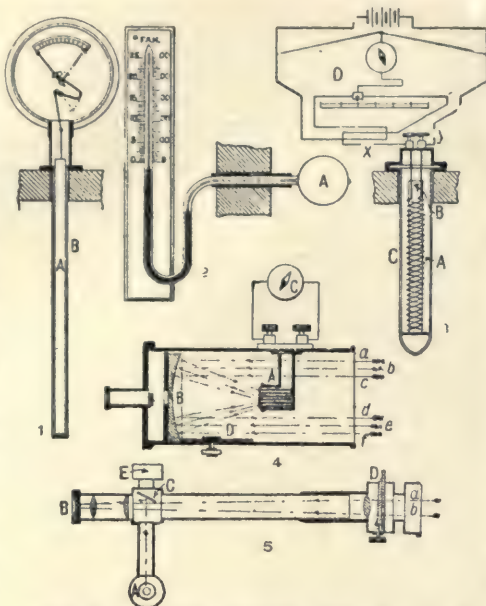
Pyroleter (Gr. *pyr*, fire; *oleter*, destroyer). Fire-extinguishing apparatus. It comprises a pump by which solutions of hydrochloric acid and sodium bicarbonate are mixed in a cylinder, and the carbonic acid gas generated by the reaction is projected upon the fire. See *Fire Prevention*.

Pyroligneous Acid. Name given to crude acetic acid (*g.v.*), obtained by the destructive distillation of wood. On account of its smoky taste, pyroligneous acid is sometimes sold as essence of smoke, and is used for the purpose of imparting to hams and bacon a smoky flavour.

Pyrolusite (Gr. *pyr*, fire; *louein*, to wash). In mineralogy, the name given to manganese dioxide. Nearly black to steel grey in colour, with a metallic lustre, it is one of the common ores of manganese. It is used as a colouring material, and in the manufacture of chlorine and oxygen and many manganese alloys. See *Manganese*.

Pyromancy (Gr. *pyr*, fire; *mantia*, divination). Divination by means of fire, practised in classical times and probably much earlier. The movements of the flame and the forms assumed by the embers were noted, and omens deduced from them. See *Divination*; *Magic*.

Pyrometer (Gr. *pyr*, fire; *metron*, measure). Instrument for measuring temperatures above those within the range of mercury thermometers. The first pyrometer depended upon the expansion of metallic bars, while Wedgwood devised an instrument which depended upon the contraction of clay cylinders under heat. The gas thermometer depends upon the expansion of nitrogen.



Pyrometer. Diagrams illustrating chief types of the instrument. See text

Expanding metal instruments are still used, especially for moderately high temperatures, such as those of boiler flues. Fig. 1 shows such an instrument in which the metals are a copper bar, A, and an iron or steel tube, B, which is exposed to the heat; both the metals expand, but as the copper bar lengthens more than the iron tube, the effect is that the bar lengthens upwards. The movement is very slight, but is multiplied by a system of levers sufficiently to move the index pointer over the scale, thus indicating the temperature reached. Fig. 2 is a diagrammatic view of an air or gas pyrometer in which is a bulb, A, of porcelain, which is exposed to the heat to be measured. The bulb is filled with air or gas which, as it expands under the influence of the heat, presses upon a column of quicksilver in a partially protected glass tube. The end of the tube remote from the bulb is sealed, and has a graduated scale attached.

Instruments have been devised, the principle of which depends on the fact that the resistance of an electrical conductor varies with the temperature.

Electric Pyrometers

The essential features of a modern instrument on this principle are shown in Fig. 3, where A is the electrical conductor in the form of a double coil of platinum wire wound on a strip of mica, B, and enclosed in a porcelain container, C, sealed at the lower end, which is exposed to the heat. The

coil is connected by leads through the binding screws shown with an electrical system, D. The electrical balance of this system is disturbed when the coil is heated, the degree of disturbance being a measure of the temperature. Compensating devices (not shown in the diagram) are introduced to neutralise the effect of temperature on the platinum and copper leads. The electrical portion of the instrument, which is suitable for temperatures up to 1,000° and over, may be at any distance from the coil, and hence the leads are shown interrupted at x, y.

Electrical pyrometers are also made for determining temperatures by means of radiant heat. The oldest arrangement is the thermopile, which consists of a number of bars, alternately of antimony and bismuth, soldered together in series. The junctions of the metals are coated with lamp-black so as to absorb radiation. When this absorption takes place an electric current is set up which can be measured by a delicate galvanometer. Fig. 4 shows such an instrument, A being the thermopile. The rays of heat enter as shown by the dotted lines, a, b, . . . f, and are reflected on to the thermopile by the lens, B, the current thus set up being communicated to the galvanometer, C, through the binding screws and leads shown. D is a rack and pinion by which the position of the lens B may be adjusted.

Optical Pyrometers

Optical pyrometers depend for their principle on the change of colour of a heated body from red to white with change of temperature. A change of brilliancy also accompanies these phenomena, and all three can be estimated accurately by the employment of suitable photometers, as shown diagrammatically in Fig. 5, which is a plan view. The rays of heat enter at a, b, and reach the eyepiece, B, through suitable lenses. At D are two plates of tinted glass, adjustable so that their united thickness may be varied. A is a standard lamp, the light from which is reflected into the eyepiece by the mirror, C. D is adjusted until an agreement in colour or brilliancy is reached between the rays from the lamp and those from the furnace or other source of heat, when the temperature is indicated by a pointer on one of the adjustable plates and a scale on the other.

Pyromorphite. In mineralogy, a lead phosphate and chloride. It has a resinous lustre, green, yellow, and shades of brown in colour, and is found with lead ores. See *Lead*

Pyrope. Blood-red variety of garnet. Alternatively named Bohemian garnet, it is found in basic and eruptive rocks of the serpentine and peridotite groups, near Leipzig in Saxony, Bohemia, in N. America, S. Africa, and near Elie in Scotland. The stone is cut as a gemstone, and though usually of small size, large specimens have been found. Those obtained in the diamond fields of S. Africa are known as Cape rubies, but they are easily distinguished from genuine rubies by their optical properties. *Pron.* Py-röp.

Pyrophorus. Substance which takes fire on exposure to air. Homberg (1662-1715) discovered that if he heated together in a tube a mixture of lamp black, alum, and flour, the charred mass caught fire on being shaken out of the tube. In the same way sulphides of potassium, sodium, and lithium can be prepared, which take fire on exposure to air. Pyrophoric iron and lead are also known, the latter being made by charring lead tartrate. The pyrophoric iron used in pocket lighters is an alloy of iron and cerium. When struck or rubbed this alloy gives off brilliant sparks, which in pocket lighters are made to ignite petrol vapour.

Pyrotechnics (Gr. *pyr*, fire; *techné*, art). Scientific name for the art of making fireworks (*q.v.*).

Pyroxene. In mineralogy, the name given to a group of silicates. They are generally silicates of calcium and magnesium, but may also contain iron, aluminium, chromium, manganese, zinc, etc. The chief pyroxenes are augite, an aluminium pyroxene; diopside, a calcium manganese, white, grey, yellow, or green in colour; hedenbergite, a calcium-iron pyroxene, black in colour, etc. The pyroxenes are constituents of limestone gneisses and igneous rocks, particularly the latter, and some are cut and polished as gem stones.

Pyroxenite. In geology, an igneous rock composed mainly of varieties of pyroxene or amphibole. The rock changes through weathering into serpentine and talc.

Pyroxylic spirit. Name for crude methyl alcohol (*q.v.*).

Pyroxilin. Alternative name for gun-cotton (*q.v.*), and particularly for the soluble variety used for the preparation of collodion.

Pyrrha. In Greek mythology, wife of Deucalion, king of Phthia in Thessaly. She and her husband were the sole survivors of the great flood which Zeus caused to overwhelm the world. *See* Deucalion.

Pyrrho (d. c. 275 B.C.). Greek philosopher, founder of the first school of Sceptics. He was a native

of Elis, and accompanied Alexander on his Indian campaigns. His chief doctrines were: We can know nothing of the real nature of things, since the contrary of everything that appears true may be equally true; we must therefore withhold our judgement, and whatever happens, preserve our imperturbability of mind, which alone brings happiness. Virtue is the only thing that really matters; all external things are indifferent.

Pyrrhotite. In mineralogy, an iron sulphide, generally mixed with nickel. Yellow to red in colour, with a metallic lustre, it is found in some meteorites, with magnetite, apatite, etc.

Pyrrhus (318-272 B.C.). King of Epirus, and one of the most noted generals of ancient times.



Pyrrhus,
King of Epirus

(*q.v.*) he was again in exile. Taking service under Antigonus, he found himself a hostage of the Egyptian king Ptolemy, when his patron had been defeated at the battle of Ipsus, 301 B.C. Ptolemy assisted him to recover his father's throne. Consolidating his position as king of Epirus, he began to endeavour to extend his dominions, chiefly at the expense of Macedonia, and for a time was in actual possession of the whole of that country.

In 281 B.C. the inhabitants of Tarentum in southern Italy, who were then at war with Rome, appealed to Pyrrhus for help, and in the following year Pyrrhus appeared in Italy with a considerable army. The Romans were defeated in two successive battles at Heraclea, 280, and at Asculum, 279, but at such cost in human life that the term "Pyrrhic victory" has passed into a proverb. An invitation from the Sicilian Greeks for assistance against the Carthaginians took him over to Sicily in 278, his lieutenant Milo being left in command at Tarentum.

The Sicilian campaign was at first successful, but finding himself very much handicapped by the

lack of unanimity among the Sicilian cities, Pyrrhus in 276 returned to Tarentum. His last battle with the Romans took place at Beneventum in 275, and resulted in a severe defeat. His resources failing, he returned to Epirus, but before long he was again engaged in new schemes of conquest. After failing to take Sparta, he attacked Argos, but in the street fighting in that city he was killed by a tile thrown from one of the houses by an old woman.

Pyrröl. Colourless oil with a pleasant ethereal smell. It is obtained by fractional distillation from bone oil. When heated with acids it is converted into pyrrol. By the action of iodine on potassium pyrrol, a substance known as iodoform is produced, which is used as an antiseptic in place of iodoform, over which it has the advantage of freedom from smell.

Pyrus. Genus of trees of the natural order Rosaceae. *See* Apple.

Pyruvic acid. Organic liquid acid, with an odour resembling meat extract and acetic acid. It is also called pyroracemic acid, because it is produced by the distillation of racemic acid, an isomer of tartaric acid. Lactic acid is formed by the action of nascent hydrogen on pyruvic acid.

Pytchley. Famous English hunt. It hunts a stretch of country in Leicestershire and Northamptonshire, from Market Harborough to Northampton, the district being about 20 m. from N. to S., and 25 from E. to W. The kennels are at Brixworth. Founded about 1750, Earl Spencer was the first master, and later earls have been among its leading supporters. From 1827-34, Squire Osbaldeston was master of the pack. The Woodland Pytchley is an offshoot of the Pytchley, having been established in 1874 to hunt the part of the country N. and E. of that now hunted by the older pack. The kennels are at Brigstock. Both packs are the property of the members. *See* The Pytchley Hunt, H. O. Nethercote, 1888. *Pron.* Pitchley.

Pythagoras (b. c. 582 B.C.). Greek philosopher. Born at Samos, he settled at Crotona, in Italy,



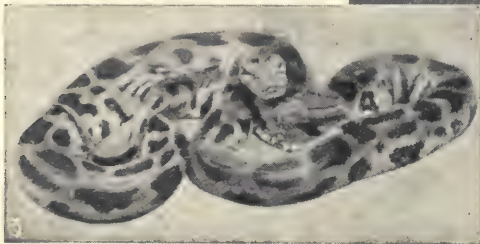
Pythagoras,
Greek philosopher

about 529 B.C., and there founded a school or society, half-religious, half-philosophical. His disciples were bound by very strict rules, underwent a comprehensive training

mathematics, and music, practised vegetarianism, and believed in immortality and the transmigration of souls. The mystic side of his philosophy seems to have been derived by Pythagoras from the hymns attributed to the mythical Orpheus, and also perhaps from his travels in Egypt.

Like the philosophers of the Ionian School, Pythagoras attempted a scientific explanation of the universe in terms of some one thing, but whereas Thales taught that all substances are variants of water, and Heraclitus that they were variants of fire, Pythagoras found the *archē* or first principle of the universe in number. Number, he taught, determined the harmonies of music, the proportions of architecture, the movements of the sun, moon, and stars, and the harmonies of the spheres.

From these foundations it was easy to identify number with everything that is orderly, proper, right, good, and beautiful. Pythagoras is regarded as the real founder of the science of geometry, and

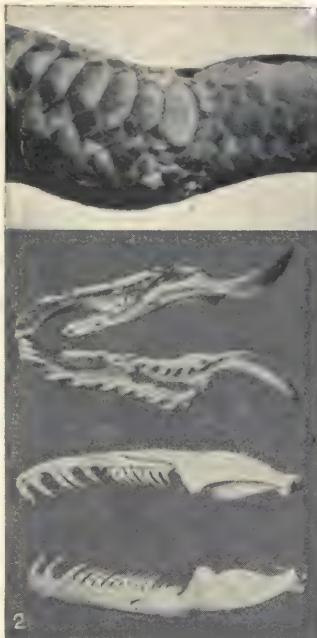


Python. 1. Portion of Indian python showing, at A, spur or vestige of pelvic girdle. 2. Lower and, above, upper jaw of Indian python. 3. Coiled specimen

W. S. Berridge, F.Z.S.

also as the discoverer of the musical octave. The proof of the famous 47th proposition of Euclid is attributed to him. The body of doctrine taught by Pythagoras was carefully conserved by his followers, and had great influence upon subsequent speculative thought. The philosophy of Plato is much indebted to Pythagoras. See *Early Greek Philosophy*, J. Burnet, 2nd ed. 1908; *Pythagoras and the Delphic Mysteries*, E. Schuré, Eng. trans. 1910; *Greek Thinkers*, T. Gomperz, Eng. trans. 1901-12.

Pytheas (4th century B.C.). Greek geographer and astronomer. A native of Massilia (Marseilles), he circumnavigated the coasts of Europe from Gades (Cadiz) as far as Thulé, probably the Orkneys and Shetlands, and published the result of his expedition in one or more works, only fragments of which remain. Pytheas calculated the height of the sun by observing in his native place the relation of



the gnomon to the length of its shadow at the time of the summer solstice, and is said to have been the first to connect the spring tides with the phases of the moon.

Pythia. Priestess of Apollo, who gave the responses at the oracle of Delphi or Pytho.

Python. In Greek mythology, the serpent born of the mud left by the flood which overwhelmed the world in the time of Deucalion (q.v.). This serpent was killed on Mt. Parnassus by Apollo with his bow and arrows, and the Pythian Games were supposed to celebrate this victory. See *Leto*.

Python. Genus of large serpents found in the tropical parts of the E. hemisphere. They belong to the boa family, and are distinguished by the structure of the skull. None of them has poison fangs, but the jaws carry numerous sharp curved teeth. The backward curve of the teeth makes it impossible for the victim to tear himself away.

But the conspicuous characteristic of the pythons is their great size. Usually they range from 15 to 20 ft. in length, and have been known to attain 30 ft., with a thickness of body in proportion. They kill their prey by constriction with the coils of the

body, by which means the bones of the victim are broken and the entire body crushed and elongated for swallowing. Pythons live among trees near water, and capture their prey—small deer, goats, and other animals—by night. The female has the unusual habit of incubating her eggs, lying coiled about them for some eight weeks. There are numerous species, all handsomely marked and mottled. See *Animal*, colour plate; *Snake*.

Pyx (Gr. *pyxia*, box). Vessel in which the Blessed Sacrament is reserved for administration to the sick. The word is found in a decree of Pope Leo IV (c. 850), ordering that nothing shall be placed above the altar save the pyx, and in early times the pyx was kept suspended above the altar. Later it was kept in the locked tabernacle on the altar. The pyx is usually of vase form.

Pyx, TRIAL OF THE. Periodical testing of gold and silver coins issued by the English mint. The practice dates from the time of Henry II, and undoubtedly originated in the testing of coins for the king by private contractors. The coins are now tested annually, as a rule by persons selected from the Goldsmiths' Company, one gold coin out of every 2,000 minted and one silver coin out of every 60 lb. Troy of silver being put aside in the pyx or box for the purpose. The trial takes place in the hall of the Goldsmiths' Company, London. See *Mint*



Sacred pyx of silver gilt chiselled in high relief, early 17th century

By courtesy of the director, Victoria and Albert Museum, S. Kensington



F.G.

Q. Seventeenth letter of the English and Latin alphabets. It has the sound of hard *c* (*k*), and in English is always accompanied by *u*, the combination being pronounced as *kw*. *Qu* also has the simple *k*-sound, especially in French and other foreign words, and in the termination *-que*, as in *grotesque*, *opaque*, where *e* is mute. *Quay* is pronounced *kee*. See Alphabet; Phonetics.

Q. Pseudonym adopted by Sir A. T. Quiller-Couch (*q.v.*) as a writer of journalistic causeries and many novels.

Q.A.I.M.N.S. Abbrev. for Queen Alexandra's Imperial Military Nursing Service (*q.v.*).

Q-Boat. Name given in the Great War to a ship used to trap submarines. Also known as mystery ships, Q-boats carried concealed guns that could be unmasked by dropping a flap or letting down the sides of a deck-house. Their crews were dressed as merchant seamen, and one section of them was trained to behave as if panic-stricken when a submarine showed herself.

In equipping a Q-boat all kinds of camouflaging devices were employed to conceal wireless aerials, look-out posts, etc. The boats masqueraded as merchant vessels, so that in the event of their being sunk the crew would have a plausible answer to give the submarine's officer in reply to his inquiries as to their name, destination, etc. For this purpose the name of some vessel on Lloyd's Register was "borrowed." It was changed daily, and particulars for the crew

were posted on a notice-board, humorously called The Daily Liar. Among Q-boats were the Hyderabad and the Suffolk Coast, and noted commanders were Capt. Gordon Campbell, V.C., and Lieut. Auten, V.C. See Camouflage; consult also Q. Ships and their Story, E. K. Chatterton, 1922.

Q.E.D. Abbrev. of the Latin phrase, *Quod erat demonstrandum*, which was to be demonstrated.

Q.E.F. Abbrev. for the Latin phrase, *Quod erat faciendum*, which was to be done.

Q.M.G. Abbrev. for quarter-master-general.

Q.M.S. Abbrev. for quarter-master-serjeant.

Quaalagh. New Year's Day first footing (*q.v.*) in the Isle of Man. Parties of young men went from house to house uttering in jingle form good wishes for all the inhabitants. The party was then invited in and given refreshments, the first to enter being a dark man, for the ensuring of good luck to the household.

Quack. Term used generally for one who falsely professes knowledge—especially medical knowledge—and more strictly for one who disingenuously puffs worthless remedies. The word is an imitation of the noise made by a duck, and alludes to the

chatter with which a quack vaunts his skill. It was formerly used for medical impostors only, but is now applied to any charlatan (*q.v.*). The original form of the word was "quacksalver," i.e. one who "quacks" or gabbles in praise of his "salves," ointments, or remedies.

Quadragesima (Lat. *quadragesimus*, fortieth). Latin name for Lent, or for the 40 days' fast before Easter. It denotes the first Sunday in Lent. In the English Prayer Book the word is only used in the Tables and Rules.

Quadrangle. Rectangular or nearly rectangular court enclosed by buildings. The quadrangle was a conventional feature of monastic architecture, the cloisters being a special feature, and was adopted for colleges and large houses; for the latter notably in the Tudor Period, as at Hampton Court and Compton Wynyates. At the universities the abbrev. "quad" is applied to the courtyards of colleges even when these are not completely enclosed. Tom Quad at Christ Church, Oxford, is one of the most famous. In modern garden cities (*q.v.*) houses are frequently grouped round a quadrangle. See Corpus Christi College; Haileybury; Jesus College, Oxford.

Quadrant. Instrument formerly used by navigators for fixing the position of a vessel at sea by taking angles. It has been superseded by the sextant. See Navigation; Sextant.

The quadrant electrometer is an instrument for measuring electricity. The best-known type is that invented by Lord Kelvin. See Electrometer.



Quadrant formerly used in navigation

By courtesy of Negretti & Zambra

Quadrat. In typography, piece of metal cast lower than the letters and used for spaces between them, and for filling out blank lines. It is usually abbreviated as quad.

Quadratic Equation. In mathematics, equations which involve the second power of the unknown quantity. Every quadratic equation can be reduced to the form $x^2+ax+b=0$ where x is the unknown quantity, and a and b the terms in which its value may be expressed. See Equation.

Quadratrix (Lat. *quadrare*, to square). In mathematics, name given to a type of curves the ordinates of which are a measure of the areas of other curves. One of the most famous of these curves is that called the quadratrix of Dinostratus. It is the plane locus of the intersection of a straight line revolving uniformly about a point and another straight line moving uniformly parallel to a given direction. It was realized that the construction of such a curve, one of the most ancient of transcendental curves, would enable the squaring of the circle, the duplicating of the cube, and the trisection of an angle to be accomplished, the three most famous geometrical problems of the ancients. The quadratrix of Tschirnhausen is a curve with similar properties.

Quadrature. In astronomy, the relative position of two heavenly bodies when their difference of longitude is 90° . The first quarter of the moon is its eastern quadrature, the last its western quadrature. Quadrature of an inferior planet with the sun is impossible, since its maximum elongation is less than 90° .

In mathematics quadrature is the finding of an area equal to a given area. It is usually restricted to the finding of a square equal in area to a given area. The squaring of the circle (*q.v.*) was one of the three famous problems of antiquity. The area of any figure bounded by straight lines is easily found, since the figure may be divided into triangles, the areas of which were first demonstrated by Euclid. The areas of figures bounded by curves cannot in general be found. Where the equations of the curves can be stated in algebraic functions, however, the areas can be obtained by the calculus. See Mensuration.

Quadrilateral. Four-sided polygon. Particular kinds of quadrilateral are the square, parallelogram, rhombus, and trapezium. The word usually indicates a figure in one plane, a quadrilateral not in one plane being known as a gauche quadrilateral.

Quadrilateral (Lat. *quatuor*, four; *latus*, side). Name used for four fortresses grouped for strategic purposes. Perhaps the most famous quadrilateral is the one in N. Italy, composed of the fortified towns of Peschiera, Mantua, Legnago, and Verona, which enabled the Austrians to maintain their hold on N. Italy. Verona, commanding the Adige valley, allowed supplies to come from Austria, and Mantua was so strongly situated and fortified that it was long deemed impregnable. In 1848, Peschiera fell to the Italians, who then besieged Mantua, but they met with a reverse at Custozza and retreated. After the battle of Solferino, the French and Italians were bombarding Peschiera, when the peace of Villafranca terminated hostilities. In 1866 the Italians again attempted to capture the quadrilateral, but without success.

Quadrilateral was also the name given to a redoubt in France, $\frac{1}{2}$ m. E. of Ginchy, in a ravine adjoining the Morval Road—prominent in the Great War. It was strongly fortified by the Germans to cover Morval, and was captured by the British 6th Division on Sept. 18, 1916. Another quadrilateral was the strongly defended series of trenches held by the Turks east of Kereves Dere on the Gallipoli peninsula in the Great War. It was stormed by the French in June, 1915. Other quadrilaterals were those of N.E. Germany, whose fortresses were Königsberg, Danzig, Posen, and Thorn, and of Poland consisting of Brest-Litovsk, Ivan-gorod, Novo-Georgievsk and Warsaw. See Gallipoli, Campaign in; Somme, Battles of the.

Quadrille (It. *squadra*, a square). Dance which originated in the French ballets of the 18th century, and was later transferred to the ballroom. It is danced by four couples who stand in a square. The music consists of five parts: Le Pantalon, L'Eté, La Poule, La Trénise, and Finale, the names being taken from old *contre-danses*. See Dancing.

Quadrille. Obsolete or almost obsolete card game. It is an offshoot of Ombre (*q.v.*), and is played by four persons with 40 cards, the 8, 9, and 10 of each suit being eliminated from the pack.

Quadrirème. Ancient war vessel. It was propelled by four banks of oars, one above the other. See Trireme.

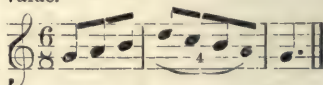
Quadroom (Span. *cuarteron*; from Lat. *quartus*, fourth). Term applied generally to one who has one-fourth negro blood—the offspring of a white and a mulatto. It is sometimes applied to a person

who is fourth in descent from a negro ancestor, provided that one of the parents in each generation has been white; the person who is third in descent is known as a *terceron*. The Spaniards early used the word for the offspring of a white and an Indian half-breed, and it is sometimes applied to similar crossings in other races, and also to animals and plants. See Negro.

Quadruplane. Name for an aeroplane whose main lifting surfaces take the form of four sets of superimposed wings.

Quadruple Alliance (Lat. *quadruplus*, fourfold). Alliance of four countries. Such was the treaty of 1718 by which Great Britain, the Netherlands, France, and the Empire, signed an agreement to uphold the treaty of Utrecht against the aggressive policy then pursued by Spain. Another quadruple alliance was signed in 1834 by Great Britain, France, Spain, and Portugal, with the object of keeping the Dom Miguel from the throne of Portugal. See Treaty; Triple Alliance.

Quadruplet. Musical term for an abnormal group of four equal notes. It is performed in the time of three or six of the same nominal value.



Quaestor (from Lat. *quaerere*, to ask, inquire). Magistrate of ancient Rome. Their number was originally two, but by the last period of the Republic it had increased to 40. Under the empire the number was reduced to 20. At the inception of the office in the early republic the quaestors had certain legal duties in connexion with inquisition into murder charges, but this function soon passed to the aediles and tribunes. Latterly, the quaestors were financial and administrative officers entirely, e.g. *quaestores classici*, who looked after the financial administration of the fleet, and *quaestores urbani*, who had charge of the treasury. The quaestorship was the lowest of the higher magistracies, whose holders were entitled to a seat in the senate after their year of office. The quaestorship was thus the first step in a public career.

Quagga. Name formerly applied to a dark variety of zebra, once common in Cape Colony. It became extinct about 1870. The name was onomatopoeic, being the natives' reproduction (*quā-hā*) of the animal's barklike neigh "*quā-hā-hā*"; it was applied by them to zebras in general. It is now believed that the supposed *Equus*

quagga was only a local race of the common zebra (*E. zebra*), Burchell's zebra (*E. burchelli*), or Chapman's zebra, with darker upper parts, the legs and under parts white and free from stripes, and the sides spotted. See Zebra.

Quai d'Orsay. Thoroughfare in Paris running for nearly 2 m. along the N. side of the Seine, from the Champ de Mars to the Pont Royal. The many government offices situated along it, including the foreign office, make it the Whitehall of France, and Quai d'Orsay is used at times as a synonym for the French government. *Pron.* Kay d'orsay.

Quail (*Coturnix communis*). Small game bird about the size of a thrush. Closely related to the pheasant and partridge, it is a native of Europe, Asia, and N. Africa. It is a fairly regular visitor, but in variable numbers, to the



Quail, a game bird which breeds in the British Isles

British Isles, breeding in many localities, mostly departing before winter. It is much like a diminutive partridge in shape and general coloration, and seeks its food under cover of the field crops. The nest is a slight grass-lined depression in the ground, and contains from seven to ten brown-blotched, buff-tinted eggs. The alarm note is a "whit-whit-whit." Vast numbers are netted in the Mediterranean countries during the spring migration, and exported alive for food. There are five other species, natives of E. Asia, Australasia, and Africa.

Quain, SIR RICHARD (1816-98). British physician. Born at Mallow, co. Cork, Ireland, Oct. 30, 1816, he became house surgeon at University College Hospital, London, 1840, and consulting physician to many other hospitals. In 1863 he became a member of the general medical council, and its president 1891, in which year he was made a baronet. He was the editor of the Dictionary of Medicine, 1882, and died March 13, 1898.

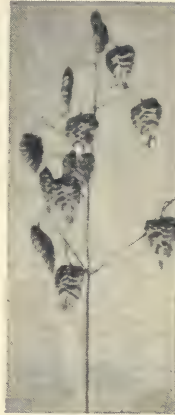
Richard Quain (1800-87), his cousin, was president of the Royal College of Surgeons, 1868, and one



Sir Richard Quain,
British physician

of its original members, and Jones Quain (1796 - 1865), another cousin, was famous as the author of Elements of Descriptive and Practical Anatomy, first published in 1828, and long one of the best known books on the subject.

Quake Grass (*Briza media*) OR TOTTER-GRASS. Perennial grass of the natural order Gramineae. It is a native of Europe, Asia, and Africa. It has creeping, underground stems and flat leaves. The flowering stems are much branched, and each of the flattened, oval, more or less purple and shining spikes is borne on a long, hair-like stalk. A smaller species (*B. minor*) has tufted stems, and is an annual.



Quake Grass. Stem and flower spikes

Quaker Girl, THE. Musical comedy by J. L. Tanner, with music by Lionel Monckton. Produced at the Adelphi Theatre, London, Nov. 5, 1910, it had a run of 536 performances. Gertie Millar appeared in the title rôle, and the cast included Joseph Coyne, Hayden Coffin, and Elsie Spain.

Quakers. Popular name for the Society of Friends. Its original derisive reference to the bodily tremors of members of the society when moved by the Spirit in public worship has long disappeared. See Fox, George; Jordans; Society of Friends.

Quality (Lat. *qualitas*, from *qualis*, of what kind?). In the widest sense, attribute as opposed to substance, all that can be affirmed of a being regarded as subject; in a narrower sense, a particular kind of attribute which leads to a substance being included in a certain class. Qualities have been distinguished as primary, such as are found everywhere in matter (extension, solidity, figure, motion or rest, number), and secondary, such as are not necessarily inseparable from matter (colour, taste, warmth, smell), but depend upon the action of the

primary qualities. In psychology, quality is the characteristic whereby one sensation is distinguished from every other.

Quality Street. Comedy by J. M. Barrie. Produced Sept. 17, 1902, at the Vaudeville Theatre, London, it had a run of 459 performances. The story deals with two sisters, who are reduced to keeping a school. Ellaline Terriss played Phoebe Throssel, Marion Terry appeared as her elder sister Susan, and Seymour Hicks took the part of Phoebe's soldier lover, Valentine Brown. It was revived in London in 1921.

Quamash (*Camassia quamash*). Bulbous perennial of the natural order Liliaceae, native of N.W. America. It has narrow leaves about a foot long, and a stout flowering stem bearing a spray of six-parted blue flowers. After the plants have flowered, the natives dig up the bulbs and dry them by heat, when they are pounded into cakes for use as food.

Quandary Peak. Mountain of the U.S.A., in Colorado. It rises to 14,266 ft. in the Park Range.

Quantification of the Predicate. The determination of the logical quantity of the predicate, whether it is general or particular, by the addition of the words *all*, *every*, *some*. Thus, the propositions, All A is B, some A is B, would appear as, All A is all B, All A is some B, Some A is all B, Some A is some B. See Logic.

Quantity (Lat. *quantus*, how much?). Literally, the amount of anything. The word is used in several senses. In metre it is the length of a syllable, a false quantity being an error in such length. In logic it means the extent of a conception, and in music the relative duration of a tone. In mathematics a quantity is anything that can be increased or divided or measured. See Weights and Measures.

Quantity Surveyor. One who estimates from an architect's drawings the total quantity of materials required for a building, and draws out a list of the exact amounts of the respective materials for the builder to price them and the cost of the labour to carry out the work. The Quantity Surveyors' Association is a professional society or body of quantity surveyors, with its headquarters at Caxton House, Tothill Street, Westminster, London, S.W.

Quantock Hills. Range in Somerset, England. It trends for 8 m. N.W. from a point N. of Bishop's Lydeard to the Bristol Channel, 2 m. E. of Watchet. The culminating summit is Wills Neck, 1,262 ft. high.

Quantum meruit (Lat.). Old English common law term. When a person has done work for another on the promise of payment, but fails to establish that the employer agreed to pay him a specific sum, he is entitled to recover quantum meruit, i.e. as much as he has deserved.

Quanza. Variant spelling of the West African river Kwanza (*q.v.*).

Qu'appelle. Town of Saskatchewan, Canada. It is 320 m. W. of Winnipeg and 32 from Regina, on the C.P. Rly. It is the centre of a prosperous farming district, and has elevators and a lumber yard. About 20 m. away is Fort Qu'Appelle, an old post of the Hudson's Bay Co., which gives its name to the town.

Quarantine (Fr. *quarantaine*, period of 40 days). Period during which ships, goods, or persons coming from countries where infectious disease prevails are interdicted from communication with the shore. The term is derived from the fact that usually the period was made to cover 40 days. Originally instituted as a protection against the importation of plague, and later employed as a defence against cholera and yellow fever, quarantine in the old sense is now abolished in Great Britain, the Quarantine Act of 1825, which embodied the earlier regulations on the subject, having been repealed and replaced by the Public Health Act, 1904, which enables the ministry of health, after consultation with the board of trade, to make regulations to carry into effect conventions for preventing danger to public health from vessels and the conveyance of infection by vessels. International conventions govern the concerted action of most of the other Powers. There are also, in Great Britain, regulations under which dogs imported from abroad are kept in quarantine for a definite period.

Quaritch, BERNARD (1819-99). British bookseller and publisher. Born at Worbis, in Saxony, of Slavonic origin, April 23, 1819, he settled in London in 1842 and was naturalised in 1847. After working with the publishing house of Bohn, and in Paris, he started as a

second-hand bookseller in London, at Castle Street, Leicester Square, removing in 1860 to Piccadilly, where he made his business one of the chief book buying centres of the

world. A collector of fine discrimination and much boldness, his purchases at the Sunderland sale, 1882, were memorable. He issued valuable catalogues and published many learned works. The early editions of FitzGerald's Omar Khayyám were published by him. He died at Hampstead, Dec. 17, 1899.

Quaritch, BERNARD ALFRED (1871-1913). British bookseller and publisher. Son of Bernard

Quaritch, he was born Jan. 13, 1871, and educated at a Charterhouse, joining his father's business in 1889. Like his

father, he proved an able collector, attended the Hoe sale, in New York, and paid £1,700 for a first folio Shakespeare at Christie's in 1899. In 1907 he moved the seat of his business from Piccadilly to Grafton Street. He died at Brighton, Aug. 27, 1913.

Quarles, FRANCIS (1592-1644). English poet. Born at Romford,

Essex, May 8, 1592, a member of a very old family, he was educated at Christ's College, Cambridge, and Lincoln's Inn. Appointed in 1613 cup-bearer to Elizabeth of Bohemia, daughter

of James I, he accompanied her to Germany. Secretary to Archbishop Ussher in 1629, he was chronologer to the city of London from 1639 until his death, Sept. 8, 1644. He was buried in the church of St. Olave, Silver Street. A Royalist, who wrote several pamphlets denouncing Parliament, with the result that his MSS. were destroyed by its soldiers, Quarles was a voluminous author. He is best remembered by his Emblems (moral and religious verse), 1635, and especially by his prose Enchiridion, 1641, a collection of notable essays and aphorisms. He left a pleasant memory in the minds of all who knew him, and while one of the metaphysical poets, full of strained conceits, and something of a Puritan, he possessed a lively fancy and much felicity of expression. *See* Works, ed. A. B. Grosart, 1880-81.

Quarnero, GULF OF. Arm of the Adriatic Sea. E. of the peninsula of Istria, Italy, it stretches

to the shore of Croatia, Yugoslavia, and contains the islands of Veglia, Arbe, Cherso, and Lussin. Fiume is the only good harbour on the entire coast.

Quarrel (from late Lat. *quadrrellus*, a little square). Short and heavy arrow or bolt, shot from a crossbow. It had a squared head terminating in four points. A glazier's diamond is called a quarrel. *See* Arbalest; Crossbow.

Quarry Bank. Urban dist. and parish of Staffordshire, England. It is 1½ m. S.E. of Brierley Hill. Situated in the Black Country, it is chiefly interested in coal-mining and iron-working. Pop. 7,400.

Quarrying. Removal of portions of rock from open pits or caverns cut in the earth for that purpose. The word quarry, and its French equivalent *carrière*, are connected with the Lat. *quadratus*, squared, denoting a quarry as a place from which squared stones are cut.

Methods of quarrying depend mainly on the position of the rock, its hardness, its structure, and the purpose for which it is required. A hill slope is the best site for a quarry, for its floor is not then sunk below the general surface of the ground, and there is no difficulty in raising the cut stone to that level. Since the stone, when required for building, must be cut out in blocks, use is made of natural planes of weakness, as bedding planes, joints, or cleavage; but where no such natural joints exist, the rock has to be cut. To do this, lines of holes are made with picks, and wedges driven into them until the rock splits. Another method is to drill holes elongated in the direction of the proposed cut, and to charge them with explosives. Blasting, however, must be conducted with great care when building stones are concerned, lest it shatter the rock. High explosives are used for blasting hard rocks when large quantities of material are required, and the size of the blocks is unimportant, as when road stone is quarried.

The plan on which the quarry is opened is important, and in many large quarries the stone is cut out so that the face of the quarry, i.e. the cut surface of the rock, is stepped or terraced. This method allows the quarrying to proceed simultaneously at several levels, and prevents dangerous falls of overhanging rock. In order that several gangs of men may work at once, the so-called stepped long-walled method is often adopted, the face of each terrace being cut in several vertical planes, each a little farther back than the last,



Bernard A. Quaritch,
British bookseller



Francis Quarles,
English poet



Bernard Quaritch,
British bookseller

so that each successive vertical layer has one free end, and a gang of men can be employed on each "wall." The blocks of stone are generally lifted out of the quarry with cranes, and carried to a convenient railway or harbour by trucks run on rails, though in some cases the material is carted away, or is let down a hill slope with rope gear. See Building; Marble; Mason; Stone.

Quart. British measure of liquid capacity, the fourth part of a gallon. It contains 69.3185 cub. ins., or 24 lb. of distilled water. The old English quart for wine contained 57.75 cub. ins. and for beer 70.5 cub. ins. In the U.S.A. the quart contains 67.2 cub. ins.

Quartan Fever. Form of intermittent fever in which two days intervene between consecutive attacks. The attacks, therefore, follow each other on the fourth day from the beginning of the previous attack.

Quarter. As a measure of weight or capacity, the fourth part of a larger measure, e.g. 28 lb. the quarter of a hundredweight. It is generally used for corn measure, when it equals eight bushels. The four principal points of the compass are known as the four quarters. In the plural the term is used for the place where soldiers are accommodated, and from this probably comes the phrase to give quarter, i.e. to show mercy, implying that the vanquished man will be sent to the soldiers' quarters instead of being killed. Nautically, the quarter is that part of the ship's side situated between the mainmast and the stern.

Quarter Days. In England, the days which mark the four quarters of the year. They are Lady day, Mar. 25; midsummer day, June 24; Michaelmas day, Sept. 29; and Christmas day, Dec. 25. The days are the same in Ireland, but in Scotland quarter days are Feb. 2, May 15, Aug. 1, and Nov. 11.

Quarterdeck. After-deck of a warship. It is set apart for the officers, whose cabins are generally on the decks below it, and hence arises the use of the term quarterdeck as a synonym for the commissioned officers of the navy. In pre-Reformation days a crucifix stood on the quarterdeck, and to this everyone used to do reverence when going to that part of the ship. From this arose the custom of saluting the quarterdeck, which still survives in the British navy.

Quartering. In heraldry, a method of marshalling (q.v.) whereby two or more coats-of-arms are shown on one shield. In the simplest form when two coats

are concerned, the principal one, usually the paternal arms, are placed in the first and fourth quarters, and the other in the second and third. If there are three coats, the principal one again occupies the first and fourth quarters, and the others respectively the second and third. There may be four coats, five, or even many more, but however many the divisions, it is still called a "quartered shield." Usually divisions are of an even number, the principal coat being repeated in the last quarter if necessary. But quartering by uneven numbers is often met with. Moreover, one of the coats to be introduced may already be quartered, which is then known as "grand quarter." Impaled quarters are also seen.



Quartering in heraldry

On the Continent, irregular divisions are much used. The lower part of the shield cut off by a horizontal line is called a "champane," a squat pile (q.v.) reversed, a "chape," and if the lines are curved, the shield is said to be "chapé ployé." Quarterings of this kind are said to "enté on point." Continental heralds also quarter per saltire (q.v.), and "en paille," which may be described as "per chevron reversed and per pale." See Heraldry.

Quartering is the term applied in woodwork to strips of wood of any length, but square in section, known as 2-in. quartering, etc.

Quarterly Review. THE. British periodical, devoted chiefly to literary criticism. It was projected by John Murray and Sir Walter Scott in opposition to The Edinburgh Review, which had become a purely Whig organ. The first number appeared in Feb., 1809.

William Gifford (q.v.) was editor, 1809-24, and among the early contributors were Sir W. Scott, R. Southey, G. Canning, J. W. Croker, and Reginald Heber. Mingling party politics with literary criticism, The Quarterly was for many years a staunch supporter of the Tory cause, and was famous for its attacks on authors obnoxious to that party, especially Hazlitt, Leigh Hunt, and other members of the so-called Cockney school. Its virulent review of Keats's Endymion, in Oct., 1818, gave rise to the baseless legend that The Quarterly "killed Jack Keats." After the brief editorship of Sir J. T. Coleridge, J. G. Lockhart (q.v.) con-

ducted The Quarterly, 1825-53, Sir William Smith, the classical scholar, 1867-93, being followed by R. E. and G. W. Prothero.

Quartermaster. Regimental officer generally with the rank of lieutenant, though he may be of higher rank. He assists the commanding officer to provision and clothe the unit. He receives, issues, and accounts for rations, stores, and ammunition. The post carries a special rate of pay, and is permanent. Being a commissioned officer, the quartermaster is a member of the officers' mess. He is assisted by N.C.O.'s called quartermaster-serjeants (Q.M.S.).

The word quartermaster also occurs in ranks of higher grade, e.g. quartermaster-general (Q.M.G.), a general officer in charge of the supply departments of the army, having under him assistant quartermasters-general (A.Q.M.G.).

Quatern. Old English term for a measure of capacity, as the fourth part of a pint, the fourth of a peck or stone. A 4-lb. loaf is generally known as a quatern loaf.

Quarters. Accommodation for troops, whether camp, billets, or barracks. Formerly winter quarters meant a billeting area, and the duties of a modern billeting party were discharged by a quartermaster. The term quarters has also a local meaning, e.g. the officers' quarters in barracks, and headquarters. See Headquarters; Barracks.

Quarter Sessions. English court of law, so called because it usually meets four times a year. In the counties it consists of the justices of the peace for the shire, riding, or other division thereof, and they appoint two of their number as chairman and vice-chairman respectively. Certain cities and boroughs have also a court of quarter sessions, presided over by the recorder.

These courts hear appeals from the ordinary magistrates' courts and also appeals about rating and licensing matters, but have very little other civil jurisdiction. As courts of first instance they try indictable offences of almost every kind except treason, homicide, and criminal libel. From their decision a convicted person can appeal to the court of criminal appeal, except when quarter sessions sits solely as a court of appeal from a summary jurisdiction. Similar courts exist in Scotland, Ireland, and other parts of the Empire; in Ireland the chairmen are paid judges.

Quarter sessions arose in England in the 14th century owing to the fact that the magistrates were ordered to meet four times a year to discharge the business of the county. For this purpose the

magistrates meeting in quarter sessions were the sole authority until the establishment of the county councils in 1888. Then they were deprived of their administrative duties, these having included the raising and spending of money, but they retained "their judicial authority together with the general execution of certain licence laws, and a share in the management of the county police."

Quarter-staff. Weapon formerly much used by the English. It was a staff about $1\frac{1}{2}$ ins. in diameter, from 6 ft. to 8 ft. in length, and tipped with iron at each end. It was grasped in the middle by one hand and by the other a quarter way along, now at one end and now at the other, as policy dictated, the shifting of the hand giving it a circular play. Contests with the quarter-staff formed a regular fea-



Quarter-staff, as used in mediaeval England. From a print illustrating the fight between Robin Hood and the Tanner

ture at rustic gatherings in some parts of England. See *Quarter-staff*, T. A. McCarthy, 1883.

Quartet. Musical composition written for four solo voices or instruments. The former may be for male or female voices alone, or for any combination of the two, the most usual being for soprano, alto, tenor, and bass; the latter, in most instances, is for strings alone, consisting of 1st and 2nd violins, viola, and violoncello. There are examples of the combination of wind and string instruments, while sometimes the pianoforte is used and the 2nd violin omitted. This is known as a pianoforte quartet.

The term is also used of the performers collectively, being designated either by the name of the first violinist, e.g. the Kneisel Quartet, or by the name of their headquarters, e.g. the St. Petersburg Quartet. The string instruments of the orchestra are sometimes called "the quartet," though incorrectly so, as the inclusion of the double bass makes five classes of strings. The word has been likewise applied to sets of instruments, corresponding to the 16th century "chest of viols."

Quartier Latin (Fr., Latin Quarter). District of Paris, south of the Seine. It contains the Sorbonne and was early a resort of scholars, its name being due to the fact that Latin was their usual speech. Later it became noted as the resort of students of art.

Quarto (from Lat. *quartus*, fourth). Term used of paper when a sheet is folded twice, making four leaves or eight pages, abbreviated as 4to; it is applied to books a size smaller than folio (q.v.), or usually $9\frac{1}{2}$ ins. by 12 ins. A quarto is also an Italian dry measure equalling a little over two bushels, and in Portugal a liquid measure holding nearly $3\frac{1}{2}$ litres. See *Folio*.

Quartz. In geology, name of a mineral formed of silica, SiO_2 , crystallising in the hexagonal system.

When pure, quartz is colourless, transparent, has imperfect cleavage, and is resistant to weathering. The colourless varieties are known as rock crystal, but impurities give to quartz various tints from yellow to black. It is one of the most widely distributed of all minerals, the principal ingredient of sandstones and a constituent of many clays, granites, porphyries, etc., and the veins or reefs which it forms in other rocks are often rich in gold and other valuable metals. It is harder than mild steel and scratches glass readily. The impure varieties of quartz include many precious or semi-precious stones, e.g. amethyst, cat's eye, Spanish topaz, agate, carnelian, jasper, onyx, etc.

By heating in the oxyhydrogen blowpipe quartz can be fused and drawn out into long threads which are used in the making of torsion balances, galvanometers, etc., and the fused rock is used in the manufacture of much physical apparatus. Its hardness and transparency when pure make it an excellent material for the manufacture of spectacles, lenses, etc., and it is used in the making of sandpaper, glass, refractory bricks, cements, etc. See *Gem*, col. plate; *Mineralogy*.

Quartzite. In geology, the name given to a metamorphic rock composed chiefly of quartz. It is the result of alteration of sandstone by the accretion of silica round the original sand grains and the solidification of the whole sandstone into a dense vitreous rock.

Quass (Russ., *kvass*). Russian beer. It is made from barley and rye or oat malt, and is a thick, somewhat muddy beverage.

Quassia (*Quassia amara*). Tree of the natural order Simarubaceae. A native of tropical America, the



Quassia. Leaves and tubular flowers of the Surinam variety

alternate leaves are broken up into a double row of leaflets, not unlike those of the ash. The large, tubular, scarlet flowers are clustered. The wood is intensely bitter, and was formerly used as a tonic and in dysentery, but the quassia of modern medicine is furnished by an allied tree (*Picroa excelsa*), a native of Jamaica, whose timber is exported in the shape of logs.

Quast, FERDINAND VON (b. 1850).

German soldier. The son of Ferdinand von Quast, conservator of art monuments in Prussia, he was born Oct. 18, 1850, at Radensleben, and educated at the gymnasium at Neuruppin, near Berlin. He entered the German army



F. von Quast, German soldier

as a lieutenant of infantry in 1870, was lieut.-general, and in command of the 6th division, in 1910, and three years later was general of infantry, and commander of the 9th army corps. In the Great War he came into prominence as commander of the German 6th army, which fought against the British on the R. Lys, April, 1918.

Quaternary. In geology, name given to the period of time following the Tertiary. The term is in some respects vague, and various alternative terms have been suggested for the period. Sir A. Geikie divided it into a Human period and a Glacial period or the Pleistocene. See *Ice Age*; *Pleistocene*; *Pliocene*.

Quaternions. Branch of mathematics invented by Sir W. R. Hamilton. It is an analytic method

which places a new interpretation on imaginary algebraic quantities, generalising directions in space. Such directions are commonly referred to the coordinate axes of Descartes, and expressed in terms of Cartesian coordinates. From the point of view of geometry the method of quaternions is an extension of Cartesian geometry, which gets rid of coordinate axes and treats all directions in space on the same terms, and a quaternion may be regarded as a factor or operator of two directed lines in space which changes one of these directed lines into another. The symmetry of an analytic method applicable to a space of three dimensions made Hamiltonian quaternions of the utmost value in solving problems in physics, such as are connected with heat conduction, electric potential, etc. To change the length and direction of a line involves four distinct numbers, and for this reason Hamilton called the operator bringing about the change a quaternion.

Quatorzain (Fr. *quatorze*, fourteen). In English literature, a poem of 14 rhymed iambic pentameter lines. It is often confused with the sonnet (*q.v.*), by the rigid laws of which form it is not bound. The quatorzain is divided into three quatrains of alternate rhymes, which may, but need not, be the same in the successive quatrains, and a final rhymed couplet, which the strict sonnet never has. Most of the Elizabethan "sonnets" are really quatorzains, and in spite of the efforts of the purists the mistake has been perpetuated.

Quatrain (Fr. *quatre*, four). Complete expression of a single thought in four rhymed lines of whatever measure and arrangement. The quatrain is especially apt to the epigram. The lines written by the earl of Rochester (1647-80) on King Charles II's bedchamber door are an example:

Here lies our sovereign lord the King,
Whose word no man relies on;
He never says a foolish thing,
Nor ever does a wise one.

Quatre Bras. Village of Belgium, in the prov. of Brabant. Its name comes from its position at the meeting of the Brussels-Charleroi and Namur-Nivelles main roads, 2½ m. S. of Genappe. It is famous as the scene of the battle of June 16, 1815, preceding the battle

of Waterloo. In pursuance of his intention of destroying the British and Prussian armies separately, Napoleon ordered Ney to attack

mals, 1864; The Prussian Race, 1872; The Human Species, 1879; The Pygmies, 1895. He died in Paris, Jan. 12, 1892.



Quatre Bras, Belgium. House where the duke of Brunswick, who commanded the Hanoverian troops, died of his wounds. Top, right, the village, at the cross-roads

the former at Quatre Bras while he engaged Blücher at Ligny. The marshal was slow in carrying out the order, and it was afternoon before he attacked the Dutch and Belgians under the prince of Orange. Wellington, in Brussels, hurried up some British troops, and their arrival prevented the French from scoring a success, but the fight, in which the British and their allies lost 4,500 men, was a very sanguinary and stubborn one. Towards evening, Wellington ordered a general advance which swept the French from their positions, but he was unable to reap the full fruits of his victory on account of the necessity of connecting with Blücher, who was retreating from Ligny. See Blücher; Napoleonic Campaigns; Ney; Waterloo; Wellington.

Quatrefages de Bréau, JEAN LOUIS ARMAND DE (1810-92). French anthropologist and zoologist. Born near Valleraugue, Gard, Feb. 10, 1810, he studied medicine at Strasbourg, practised and taught at Toulouse, 1838, removed to Paris, 1840, and became professor of anatomy and ethnology at the Natural History Museum, 1855. He was hon. F.R.S., 1879. His works include *The Polynesians and Their Migrations*, 1866; and an *Atlas of Human Crania*, 1875-82. There are Eng. trans. of *Metamorphoses of Man* and the *Lower Ani-*

Quatrefoil (Fr. *quatre*, four; *feuille*, leaf). In architecture, an opening in tracery consisting of four lobes tangent to the inner side of a circle and meeting each other at cusps within the circle. Square panels inscribed with a quatrefoil are a common ornament in Gothic architecture. See Cinquefoil; Cusp.

Quatremère, ETIENNE MARC (1782-1857).



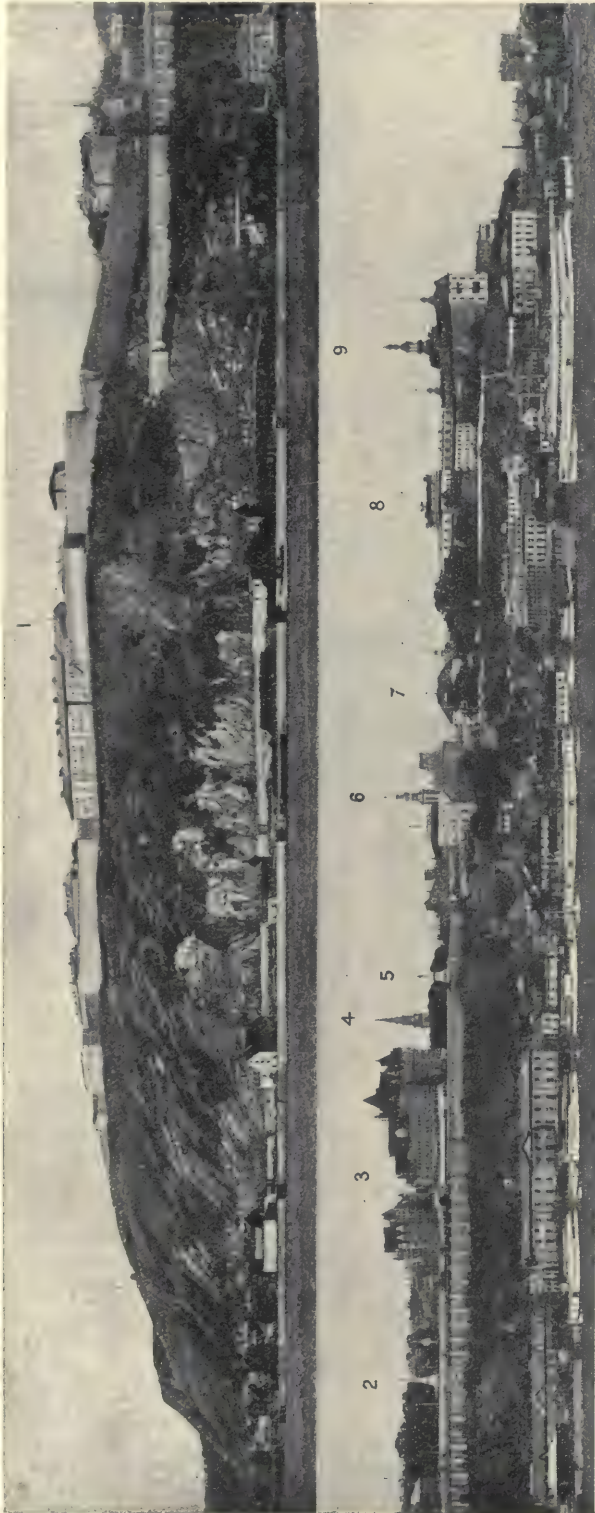
Quatrefoil, architectural examples



French Orientalist. After studying at the Collège de France, he became professor of Greek at Rouen, 1809, and of Hebrew at the Collège de France ten years later. In 1838 he was appointed professor of Persian. He was the first to prove the derivation of Coptic from ancient Egyptian, and his many philological and historical works are valuable.

Quatremère de Quincy, ANTOINE CHRYSOSTOME (1755-1849). French archaeologist. A staunch upholder of the Revolution, he occupied several responsible posts under the republic and empire. As intendant of arts and public monuments, 1815, he did much to preserve the archaeological remains of France, and wrote numerous works on architecture and art.

Quaver. Musical note represented thus: ♪, its value being one-eighth of a semibreve. Two or more quavers may be grouped thus: ♪♪. Its corresponding rest is ♪. So far as can be learned, the quaver was invented during the



From the left, in upper half of photograph, the outstanding features are: (1) The Citadel, below which, on right, begins the fine Dufferin Terrace overlooking the St. Lawrence; (2) Obelisk to Wolfe and Montcalm; (3) Chateau Frontenac, the great C.P.R. Hotel; (4) Spire

of the Anglican Cathedral; (5) Champlain Statue at extreme end of Dufferin Terrace; (6) R.C. Cathedral; (7) Archbishop's Palace; (8) the Seminary; (9) Laval University. The main portion of the city lies to the west between the points illustrated

Quebec, Canada. Panoramic view of the most picturesque city in the North American continent, as seen from Lewis, across the St. Lawrence River

15th century, being known at first as Chroma, Fusa, or Unca, and later as the Lesser Semiminim. In America and Germany it is called an eighth note, in France a crook or hook (croche).

Quay. Embarkation and landing place, formed alongside a river or sea, or in a dock or harbour, against which ships may berth. There is no fine dividing line between a quay and a wharf, but the former term is generally applied where a long stretch of river or sea shore is embanked by a masonry wall for the purpose above defined, or where a dock wall or masonry mole or breakwater provides shipping accommodation and facilities. A short coaling wharf on a river bank supported by piles would not be called a quay. Quays are usually equipped with appliances for the loading and unloading of ships, and carry railway and road traffic. Their length or area is known as quayage; the total lineal quayage of the Port of London amounts to 29½ m., that of Liverpool and Birkenhead to 37 m. See Dock; Harbour; London, Port of. *Pron. Kee.*

Queanbeyan. Town of New South Wales, Australia, in Murray co. It is 55 m. by rly. S.S.W. of Goulburn, on the Queanbeyan river. It is the rly. junction for Canberra. Pop. 1,400.

Quéant. Village of France, in the dept. of Pas-de-Calais. It is 9 m. from Bapaume (*q.v.*) and slightly S.E. of Bullecourt (*q.v.*). It was the S. end of the German Wotan, or switch line running N. to Droocourt (*q.v.*), forming part of the Hindenburg line (*q.v.*). Strongly fortified by the Germans, it was stormed by Canadians Sept. 2, 1918, on which date the British 52nd, 57th, and 63rd divisions entered the village. See Arras, Battles of.

Quebec. Prov. of Canada. Sometimes called by its older name of Lower Canada, its area is 706,834 sq. m., of which 690,856 sq. m. are land. The population in 1911 was 2,003,032. The majority, more than three-quarters, are of French descent.

Quebec arms
Quebec is the capital, but Montreal is much the largest city.

Broadly speaking, Quebec consists of two parts. The smaller and more settled is the original Canada, a narrow belt on either side of the St. Lawrence from below Quebec to just above Montreal. The larger is a vast area, covering nearly all the peninsula lying between Hudson Bay and the





Atlantic, from which it is separated by Labrador. The N. part, the former territory of Ungava, was added in 1912.

The prov. is flat, little more than one immense plateau with nothing higher than 2,000 ft., although on the S. of the river there are hills rising to nearly 4,000 ft. Its rivers, excluding the St. Lawrence, are not long. From a watershed almost in the centre of the prov. they flow in all directions; S. into the St. Lawrence, W. into Hudson Bay, N. into Ungava Bay, and E. through Labrador into the Atlantic. Others come from the U.S.A. to fall into the St. Lawrence. Lakes abound, Mistassini and St. John being the largest. The largest island is Anticosti at the mouth of the St. Lawrence.

Quebec produces wheat, barley, oats, and cereals, but is more famous for its horses, cattle, and sheep. Dairying is largely practised, fish, especially cod, are caught, and some minerals are worked. From the prov. the world obtains nearly all its asbestos. Much land is covered with forests, and lumbering is an important industry, as is the production of pulpwood. For the industries water power is abundant. The St. Lawrence is the great highway, except in winter. The more populous parts are well served with rlys., both steam and electric. Montreal and Quebec are on the three transcontinental lines, and also in direct connexion with the U.S.A. systems.

In the Dominion Parliament Quebec is represented by 65 members. Its local affairs are under a lieutenant-governor, a premier and



Quebec, Canada. 1. Palace of the R.C. archbishop and statue of Laval. 2. Church of Notre Dame des Victoires, named to commemorate the victories over the British fleet in 1688 and 1711. 3. Statue of Champlain. 4. Buildings of the Quebec legislature

cabinet, and the legislature, with a council of 24 nominated members and an assembly of 81 elected members. By the Quebec Act the Roman Catholic Church obtained freedom of worship. Separate systems of public education for the Protestants and for the Roman Catholics are carried on.

The early history of Quebec is really that of Canada. In 1535 it was taken in the name of the king of France by Jacques Cartier, and during the next two centuries was French. In 1763 it passed by conquest to Britain, and in 1791 was made a separate province. The rebellion in Quebec, 1837-38, led to the union of Upper and Lower Canada in 1841, a union which broadened into the federation of 1867. See Canada; consult also Quebec, the Laurentian Province, B. Willson, 1913.

Quebec. City of Canada and capital of the prov. of that name. It stands on the N. bank of the St. Lawrence just where it is joined by the St. Charles, being built in the angle formed by the two. It is 180 m. from Montreal. The position is a magnificent one, being on the top of bold cliffs with the river, over a mile wide, at their base. The headland is known as Cape Diamond. It is served by the three great lines, C.P.R., C.N.R., and G.T.R.

Quebec consists of an old and a new town, or lower and upper, steps leading from one to the other. The lower town is the older one, and the business centre. The old city crowns the summit of the cliff, but includes a few narrow picturesque streets at its base; the large modern manufacturing district is on the flat banks of the St. Charles. Walls, built in the 19th century, stand on the site of the original fortifications, and the citadel with its glacis and massive walls dominates the city. Outside



Quebec. Plan of the city showing principal docks and wharves



Quebec. Map of the Canadian province formerly known as Lower Canada

the walls, overlooking the St. Lawrence, are the Plains of Abraham. Of the churches the most important are the R.C. cathedral, built in the 17th century and enlarged later; Notre Dame des Victoires, built to celebrate the repulses of the English fleet in 1690 and 1711; the Anglican cathedral, and S. Matthew's. Laval University is a large building, including a library and a picture gallery. The city's finest promenade is Dufferin Terrace overlooking the St. Lawrence; here, where the Château St. Louis, the headquarters of the French government, stood until burnt down in 1834, is a statue of Cham-

plain. The Hôtel Dieu, founded in 1639, is a hospital, and there are other remains of the French occupation, including the Ursuline convent. The buildings of the Quebec legislature form a fine block standing in large grounds. Quebec's chief industry was shipping, but much of its trade has passed to Montreal. It has, however, a fine harbour, protected by the Isle of Orleans, and extensive docks. Timber is a staple industry, and here are sawmills and furniture factories. The manufactures include machinery, boots and shoes, leather goods, etc. Quebec was founded in 1608 by

Champlain, the name, an Indian one, referring to the narrowing of the river here. Earlier it was an Indian settlement. From 1629-32 it was in possession of the English, and in 1663 was made the capital of New France, being for long the largest city of Canada, the military headquarters, the centre of social life, and the ecclesiastical metropolis. In 1759 it was taken by the British, and in 1763 was ceded to Great Britain, and remained the capital of Canada until 1841. There was a great celebration in honour of its tercentenary in 1908. Pop. 78,700. See Abraham, Plains of; Bridge; consult also Old Quebec, G. Parker and C. G. Bryan, 1903; Old France in the New World, J. Douglas, 1906.

Quebec, CAPTURE OF. British success during the Seven Years' War. In 1711 the British in N. America equipped a force of 5,000 men to drive the French from Quebec, but the fleet which carried them was damaged by a storm.

In 1759, under Wolfe, 9,000 men were sent with a fleet up the St. Lawrence. On June 26 they cast anchor off the Isle of Orleans, and the French defenders offered little opposition to the establishment of their camp along the Montmorenci. For some months, however, Wolfe did nothing effective.

On Sept. 3 the troops were first moved to the other (S.) side of the St. Lawrence. On the 12th an attack was feigned below the city, while secretly Wolfe with 4,000 men went up the river in boats. In the night they were taken quietly



Quebec. The capture of Quebec by General Wolfe, Sept. 13, 1759, as depicted in an old print

to the spot, about 1½ m. above the city, selected for a landing, and in the early morning of the 13th they disembarked and ascended a narrow path to the heights above the river. The French were soon in battle order, and the engagement took place on the Heights of Abraham. The British fire soon broke the French line and the latter fled into the city, the British following until stopped by the guns of the garrison. Both the leaders, Wolfe and Montcalm, were killed. The British remained in possession, and on the 17th Quebec surrendered. See Abraham, Heights of; Wolfe.

Quebec Act. Measure passed into law in 1774, which dealt with the government of the province of Quebec, annexed by Great Britain eleven years before. The Act extended the area of the province, taking in a large tract of land N. of the St. Lawrence, previously part of Newfoundland. Roman Catholics were confirmed in the freedom of worship they had enjoyed under the rule of France, and their priests were allowed to collect tithes from the faithful. French law was to prevail in civil and English law in criminal cases. The government was entrusted to a nominated council, and the parliament in London retained the right of taxation.

Quebec Bridge. Bridge crossing the St. Lawrence river at Quebec. At the time of its erection it was the longest clear-span bridge in the world, its central span between supports exceeding the main spans of the Forth Bridge by 90 ft. The bridge is of the cantilever type, with a main river span of 1,800 ft. clear opening, which includes a girder span 640 ft. long supported on the ends of the cantilever arms, of which there are four. The total length is 3,240 ft., and the clear height from water-level to the underside of the central span is 150 ft. It carries two railway tracks and a foot-walk. It was opened to traffic in Dec., 1917.

The erection of the first bridge proceeded until one of the cantilever arms and a portion of the central girder span were completed, when, on Aug. 29, 1907, nearly half the bridge, weighing some 15,000 tons, collapsed into the river, with a loss of about eighty lives. In Jan., 1910, a contract for a new bridge of improved design was let, and work proceeded until Sept., 1916, when, in the act of hoisting the central span into position, the latter, measuring 640 ft. long and weighing 5,500 tons, collapsed, leaving the cantilever arms intact. See Bridge.



Quebracho. Leaves and flowers of the S. American tree. Inset: single flower

Quebracho (*Aspidospermum quebracho*). Tree of the natural order Apocynaceae, native of S. America. Its bark yields the drug known as white quebracho, which has been administered in cases of dyspepsia, phthisis, and bronchitis.

Quedlinburg. Town of Prussia, in Saxony. Situated on the Bode, 3 m. N.W. of the Harz Mts. and 56 m. S.E. of Brunswick, it is partly encircled by turreted walls, and consists of the old and the new town with four suburbs. The 14th century Rathaus, restored 1900, has a wooden cage where the citizens imprisoned Count Albert of Regenstein, in 1337. The castle was formerly the seat of the abbesses of Quedlinburg. The Schlosskirche, or Abbey Church, rebuilt 1070, after a fire, contains numerous historical and artistic treasures. The market gardens and nurseries are famous; there are some manufactures. Quedlinburg was founded by Henry I in 924, and was a Hanseatic town until 1477. In 1698 it came into the possession of the electors of Brandenburg. Pop. 27,000.



Quedlinburg, Prussia. The castle where the abbesses of Quedlinburg resided, and the abbey church

Queen (Anglo-Saxon *cwen*). Term applied to a woman ruler. A queen regnant rules in her own right; a queen consort is the wife of a ruling king; a queen dowager is the widow of a deceased king. While some countries bar a female from succession to sovereignty, e.g. by the Salic Law (*q.v.*), others take a queen only in default of heirs male. In the British Empire a queen succeeds when she has no brothers. Thus, Princess Mary stands in the succession immediately after her youngest brother, but before other males of the royal house. See King.

Queen, THE. London weekly newspaper for women. Its full title is *The Queen, the Lady's Newspaper, and Court Chronicle*. Founded by S. O. Beeton, Sept. 7, 1861, as *The Queen, an Illustrated Journal and Review*, it was acquired in 1862 by Mr. Serjeant Cox, who, in 1863, bought *The Lady's Newspaper*, which had existed since 1847, and amalgamated the two publications. Another amalgamation was with *The Court Chronicle*, while the *Bazaar, Exchange, and Mart* first appeared as a *Queen* supplement. *The Queen* was acquired in 1919 by the proprietors of *Land and Water*, and issued by *The Field Press, Ltd.* See *The Queen Diamond Jubilee* number, Sept. 10, 1921.

Queen Alexandra's Imperial Military Nursing Service. British nursing organization. It was founded in 1902, from the organization previously known as the *Army Nursing Service*, and consists of matrons-in-chief, matrons, sisters, and staff nurses. Appointments are given to unmarried women duly qualified under war office regulations. In 1918 the two advisory boards which hitherto dealt with the Q.A.I.M.N.S. and the Territorial Force Nursing Service were reconstituted as a joint board under the title of *Queen Alexandra's Army Nursing Board*, with the director-general, A.M.S., as chairman. There was a *Queen Alexandra's Imperial Military Nursing Service Reserve* in the Great War. See *Nursing*.

Queen Anne. Style of architecture existing in England during the reign of Anne. In point of fact, this period witnessed no special developments in architecture, and the fashionable style throughout it was according to the classic ideals of Early Georgian. But in the indigenous architecture of England there lingered many traces of the picturesque Elizabethan manner, half classic and half medieval; and the architects of the later 19th century, who reintroduced the old chimneys,

dormers, and gables into domestic dwellings, found it convenient to label their efforts as "Queen Anne." Very attractive results were obtained by Norman Shaw (*q.v.*) and others working along the same lines in England. The attempt to introduce this fashion into the United States, with different and inappropriate materials, was hardly a success. Of genuine Queen Anne buildings, Blenheim Palace, designed by Vanbrugh (*q.v.*), is one of the few examples of first-class importance. (*See Architecture.*)

In furniture, the age of Queen Anne was marked by a tendency towards comfort and homeliness, differing from the ornateness of previous periods, and altogether apart from the important movement in France. Dutch marquetry work, in some cases imitated by English furniture makers, was the only foreign element in this strongly English style. Walnut was the principal wood, but larger pieces such as the settee were in oak, as in Jacobean times. Characteristics of Queen Anne tables and chairs were the cabriole and colt's-foot legs.

Chairs, though sometimes made with solid backs, more often show the open type of back, with a fiddle or urn shaped splat. Claw-and-ball feet were common. The seat was generally loose and stuffed. Cabinets, chests of drawers, "grandfather" clocks, were ornamented with marquetry. Veneering also came into practice during this period, and some graceful effects were obtained thereby. The cabinet or chest of drawers on a stand with horned legs, veneered in walnut, is very typical of the period. The modern type of bureau, with bookcase above and sloping front covering drawers and recesses, dates from this time. Black and gold lac decoration was introduced from the East, through Holland. *See Furniture and Decoration in England during the 18th Century*, 2 vols., J. A. Heaton, 1889-92; *Old English Furniture of the 17th and 18th Century*, G. O. Wheeler, 1907.

Queen Anne's Bounty. Fund derived from the first-fruits and tenths of certain clerical incomes, formerly part of the crown revenue and transferred in 1704 by Queen Anne to the Church of England. This money was handed over to governors or trustees, and since then it has been used to improve the value of poor livings. It amounts to about £70,000 a year. The clerical incomes do not pay these first-fruits and tenths on their present value, but only on the value which they had in the time of



Queen Anne. Examples of furniture of the period. 1. Oak card table, veneered with walnut. 2. Mirror frame, decorated with gilt carving and gesso. 3. Carved and inlaid walnut armchair

By courtesy of the Director, Victoria & Albert Museum, S. Kensington

Henry VIII. *See Queen Anne's Bounty*, W R. Le Fanu, 1921.

Queen Anne's Gate. London thoroughfare, leading out of Birdcage Walk. It was first called Queen Anne Square and, then Queen Square. Since the early 18th century it has been a favourite residential locality, its attractions being its nearness to the Houses of Parliament, its view over St. James's Park, and its roomy houses of the Queen Anne period. The land belonged to Sir Theodore Jansen, and was sold to pay the debts of the South Sea Company, of which he was a director.

Queenborough. Mun. borough and seaport of Kent, England. On the Isle of Sheppey, it stands at the junction of the Swale and the Medway, 2m. from Sheerness, and is served by the S.E. & C. Rly. Formerly there was a daily service to Flushing. Glass and cement are



Queenborough arms

manufactured. Queenborough is named after Philippa, wife of Edward III, as that king built a castle here to protect the crossing of the Swale. It was made a borough about the same time, and from 1572 to 1832 sent two members to the House of Commons. It was a centre of the wool industry, and later had oyster and lobster fisheries. Pop. 2,500.

Queen Charlotte Islands. Insular group off British Columbia, Canada. The islands lie 130 m. N.W.

of Vancouver in the Pacific Ocean. Graham Island, the largest, is comparatively low and level, the smaller islands being mountainous, culminating at 5,000 ft. Forests abound, and anthracite coal is mined, and gold, copper, and iron ores are found. The whites, few in number, fish for halibut in Hecate Strait; the Haida Indians number less than 700. Jedway, Kedda Bay, Queen Charlotte City, and Skidegate are the chief settlements.

Queen Charlotte's Hospital. Lying-in hospital for women, Marylebone, London. It was founded in 1752 by the queen of George III. Six months' courses are provided for midwives, including one month in a preliminary training school; for fully trained nurses the period is four months, and there is also a five months' training for nurses. There is a nurses' home and residential school in association with the hospital.

Queen Charlotte Sound. Channel of the Pacific coast of Canada. It separates the N.E. of Vancouver Island from the mainland of British Columbia, and is connected

with the Strait of Georgia to the S. by narrow channels which do not exceed half a mile in width at Seymour Narrows.

Queen Elizabeth. British battleship, nameship of a class, and fleet flagship of the Grand Fleet during part of the Great War, 1917-18. She had previously been flagship successively of Vice-Admiral Carden and Vice-Admiral de Robeck at the Dardanelles, 1915.

The Queen Elizabeth was built at Portsmouth Dockyard and joined the active list of the fleet Dec. 22, 1914. The first British warship to carry 15-in. guns and to be driven entirely by oil fuel, she is 650 ft. long, 92 ft. in beam, displaces 27,500 tons, and has a speed of 25 knots. In her fuel bunkers 4,000 tons of oil can be carried. Her armoured belt is 13½ ins. thick; her guns and conning tower are protected by 13½ ins. armour plating, and her protective deck is 2½ ins. thick. She carries eight 15-in., twelve 6-in., and four 3-in. guns, and five submerged torpedo tubes. The Queen Elizabeth was fitted with a very powerful wireless installation and with a complete plant for taking cinema films and for carrying out all other kinds of photography.

It was aboard the Queen Elizabeth that the surrender of the German Fleet was arranged. She led the Allied Fleet on the day the actual surrender took place, and it was in her after-cabin that Rear-Admiral von Reuter made the final act of submission to Sir David Beatty after the German Fleet had anchored off May Island. Sister ships to the Queen Elizabeth are the Barham, Malaya, Valiant, and Warspite. Owing to her being in dock at the time, the Queen Elizabeth was the only battleship of her class that did not take part in the battle of Jutland.

Queenhithe (Mid. E. *hithe*, haven). London street and dock. Early in the 10th century it belonged to a Saxon, Ethedred. In the time of Stephen the property of the priory of Holy Trinity, Aldgate, subject to certain grants to S. Katharine's hospital and other charities, it became in the reign of Elizabeth the chief water gate of the city, and the tolls levied on corn, etc., landed here formed part of the revenue of queens

consort. Henry III confirmed its gift by Richard, earl of Cornwall, to the city in exchange for a rent of £50 per annum. Queenhithe, known as Cornhithe in the 12th century, was the site of London's first fish market. The 12th century church of S. Michael, known as S. Michael-de-Cornhith and S. Michael ad Ripam, was restored in 1624, burnt 1666, rebuilt by Wren, 1670-83, and demolished in 1876, when the parish was united with that of S. James, Garlickhithe. The gilded vane on



H.M.S. Queen Elizabeth, flagship of Admiral Beatty when the German fleet surrendered

the rectory, representing a grain-ship, was taken from the old church. Queenhithe gives its name to one of the city wards.

Queen Mab. Philosophical poem by Shelley. It was first published in 1813; parts of it the poet altered and revised in 1816 as *The Daemon of the World*. Written when the poet was but eighteen, it shows all his early command of poetic language and rhythm in its part regular, part irregular, blank verse, and expresses strongly the views of a youthful rebel against accepted religious beliefs. See *Mab*.

Queen Mary. British battle cruiser, of the *Lion* (*q.v.*) type, sunk by gunfire at Jutland, 1916. Completed in 1913, her details were: length 720 ft., beam 88 ft., displacement 27,000 tons, designed engine power 75,000 h.p., and speed 27 knots. She carried eight 13-in., and sixteen 4-in. guns. Ten-in. plating protected her heavy guns, her armoured belt was 9½ ins., and her armoured deck 3 ins. thick. She was present at the battle of Heligoland Bight, Aug., 1914.

Queen Mary Land. Coastal tract of Antarctica. It lies E. of Kaiser Wilhelm II Land (*q.v.*), and is bounded by Davis Sea and Shackleton Shelf, and holds Denman and Northcliffe glaciers. Its coast line touches the Antarctic Circle. It was explored by the Mawson Australasian expedition of 1911-14.

Queen Mary's Needlework Guild. British organization set up in 1914 to arrange the provision of garments for the sick and wounded, comforts for men on service, and clothes for the poor. The queen saw at an early stage in the war that much energy was likely to be dissipated on useless sewing, and that amateur needlewomen might be taking much needed work from working women. Under a small committee measures were taken to see that the voluntary work did not interfere with ordinary employment, arrangements were made that there should be no overlapping, and eventually workrooms were set up where unemployed women could be employed. Friary Court, St. James's Palace, became a great clearing house for hospital requisites and soldiers' comforts. In the first year of the war the distribution of garments varied from 21,000 to 50,000 a week.

Queen's, AND QUEEN'S OWN. Prefix given to a number of regiments in the British army. The Queen's is the popular designation of the Royal West Surrey regiment (see *West Surrey Regt.*), and the 16th Lancers. Queen's Own is a designation used in the titles of the following: 4th, 7th Hussars, Cameron Highlanders. The 9th Lancers are officially the 9th (Queen's Royal) Lancers. See *Hussars*; *Lancers*.

Queens. Bor. of New York City, U.S.A. It includes Long Island City, Jamaica, Newtown, part of Hempstead, and several islands in Jamaica Bay. Important industries are carried on in Long Island City. It was constituted a borough, Jan. 1, 1898. Its area is 103 sq. m. Pop. 379,750. See *New York*.

Queensberry, MARQUESS OF. Scottish title held by the family of Douglas since 1682. In 1633 Sir William Douglas, lord of Drumlanrig, was created earl of Queensberry; he had been a baron and a viscount since 1628. His grandson, William, the 3rd earl, was made a marquess in 1682 and a duke in 1683. He was succeeded in 1695 by his son James, who was made duke of Dover and marquess of Berberly in 1708. When James died in 1711 his titles passed by special remainder to his second son, Charles, the eldest being an imbecile. Charles died in 1778, when the English titles became extinct, but the Scottish ones and the estates passed to William Douglas, earl of March, a descendant of the 1st duke. This strange being, old Q, died in 1810, when the titles were separated. The dukedom, and with it the estates, passed to

the 3rd duke of Buccleuch; they included Drumlanrig Castle, in Dumfriesshire. The marquessate passed to Sir Charles Douglas, who became the 5th marquess, and from him the titles passed to his son and other descendants. The 8th marquess was the sportsman who drew up, in 1867, the boxing rules called by his name. In 1920 Francis (b. 1896) became the 10th marquess. The peer's eldest son is known as Viscount Drumlanrig. *See Boxing; Douglas.*

Queensberry, James Douglas, 2ND DUKE OF (1662-1711). Scottish politician. He was born Dec.

18, 1662, and became a privy councillor of Scotland, 1684, but joined the army of the prince of Orange on Nov. 30, 1688. He succeeded his father as duke of Queensberry, March 28, 1695, and in 1700 was appointed high commissioner of the Scottish parliament. Prominent in bringing about the union of the parliaments in 1707, Queensberry was rewarded with the Garter. Subsequently a commissioner to the first parliament of Anne, he acquired the name of the Union Duke, and he closed the last Scottish parliament, Jan. 6, 1707. His reception in England after this event was a "progress of triumph."

A pension of £3,000 was granted, and in May, 1708, he was created duke of Dover, marquess of Beverley, and Baron Ripon. He was also made a secretary of state, and died July 6, 1711.

Queensberry, William Douglas, 4TH DUKE OF (1724-1810). Born Dec. 16, 1724, he succeeded



4th Duke of Queensberry

his father as earl of March in 1731. Unsuccessful in his claim to the peerage of Cassilis (1759), he was a representative peer for Scotland from 1761 to 1784, and became duke of Queensberry, Oct. 22, 1778. Under the title of Baron Douglas of Amesbury, he was created a peer of Great Britain in 1786. In politics he figured only as a supporter of the prince of Wales in opposition to George III's ministers, and subsequently became contemptuously known to

the town as "Old Q." and, living at No. 138 in that thoroughfare, as the "Star of Piccadilly." McCarthy, writing of the rowdies of that period, distinguishes Queensberry as the "worst and basest spirit of the gang." He died Dec. 23, 1810. *See Piccadilly; consult also Life, J. R. Robinson, 1895.*

Queensbury OR **QUEENSHED.** Urban dist. of Yorkshire (W.R.), England. It is 4 m. from Halifax, with a station on the G.N. Rly. Stone and coal are worked, and there are manufactures of woollens and worsteds. Pop. 6,100.

Queen's Channel. Indentation on the coast of Northern Territory, Australia. It is in the S.W. corner of Arnhem Land, and receives the Victoria river.

Queen's Club. London athletic club. Founded in 1886, it is at West Kensington, London, W. Its objects are to provide various games for members. It has a football ground, running track and courts, open and covered, for tennis, racquets, fives, etc., and there is a club house.

Queen's College. College of Oxford University. It was founded in 1340 by Robert de Eglesfield,



Queen's College, Oxford, arms

chaplain to Philippa, queen of Edward III. Its visitor is the archbishop of York, and from its opening it has had a special connexion with the north of England, some

scholarships and the Hastings exhibitions being confined to a number of schools in Cumberland,



Queens' College, Cambridge. College buildings seen from the banks of the Cam



Queen's College, Oxford. Front quadrangle with entrance from the High Street

Westmorland, and Yorkshire. Until 1854 all scholarships were confined to boys from these counties. Its head is the provost, and Henry V was a student here. The buildings face the High Street. In the classical style, they were erected by Wren and Hawksmoor, and the most interesting part is the library. At Queen's every Christmas Day at dinner a boar's head is carried into the hall and an old carol is sung. The college owns much valuable land in Southampton. *See Oxford.*

Queens' College. College of Cambridge University. Founded 1448 by Margaret of Anjou, wife of



Henry VI, with the assistance of Andrew Docket, rector of S. Botolph's and principal of S. Bernard's hostel, it was described as "The Queenes

Queens' College, college of sainte Cambridge, arms Margarete and sainte Bernard." Refounded in 1465 by Elizabeth Woodville, wife of Edward IV, and provided by statutes of 1475 with a president and 12 fellows, Queens' retains much of its early architectural character. The E. front was restored in 1875 and the hall in 1875 and 1909. The existing chapel dates from 1891, its predecessor now serving as a lecture-room and library annex.

Famous men associated with the college include John Fisher, bishop of Rochester; John Whitgift; Thomas Fuller, the antiquary; and, preeminently, Erasmus, after whom a tower and court are named, and who was in residence in 1510. In 1920 there were 221 undergraduates.

Queen's College. London college for the higher education of women. It was established in Harley Street, London, in 1848, by F. D. Maurice and other professors of King's College, with the aid of the Governesses' Benevolent Institution, and was incorporated by royal charter in 1853. The



Queen's College, London. The college building in Harley Street

college is self-supporting, and the course extends over four years. See Beale, D.; Maurice, F. D.

Queen's County. Inland co. of Ireland. In the province of Leinster, its area is 664 sq. m. The surface is generally flat or undulating, but in the N.W. are the Slieve Bloom Mts., and in the interior much bogland. The chief rivers are the Barrow and the Nore. Agriculture is the main occupation, but a little coal is mined in the S.E. The G.S. & W. Rly. and the Grand Canal serve the county. Maryborough is the county town; other places are Mountmellick, Portarlino, Abbeyleix, and Stradbally. The most notable secular ruin is that of the castle on the rock of Dunamase, near Maryborough.

The district, which in 1556 was made a county and named after the queen of England, was before that time covered by the districts of Leix and Ossory. It had a number of religious houses, including those at Timahoe, Aghaboe, and Abbeyleix, while Aghaboe was also the seat of a bishop. The chief families were the O'Mores in Leix and the Fitzpatricks in Ossory. It was invaded by the English, but they did not take possession of it until the 16th century. Pop. 55,000.



Queensferry, Linlithgowshire. Town and harbour, from the Forth Bridge

Queensferry, NORTH. Village of Fifeshire, Scotland. It stands on the N. side of the Firth of Forth, opposite S. Queensferry. With a station on the N.B. Rly., it is visited in summer for bathing, and fishing is carried on. Pop. 1,000.

Queensferry, SOUTH. Royal and mun. burgh and seaport of Linlithgowshire, Scotland. It stands on the Firth of Forth, at the S. end of the Forth Bridge, 9 m. from Edinburgh, with a station on the N.B. Rly. The chief industry is connected with the preparation of oil. Owing to its proximity to Rosyth,

to the fact that from here Margaret, the wife of Malcolm Canmore, frequently crossed the Forth when travelling between Edinburgh and Dumbarton. It is mentioned in Scott's Antiquary and Stevenson's Kidnapped, the former immortalising the Hawes Inn here. Queensferry was made a burgh in 1363. Pop. 2,800. See Forth Bridge.

Queen's Hall. London concert hall. In Langham Place, W., it was opened in 1893, and consists of two halls, the largest of which has seating accommodation for more than 3,000. The concerts of the New Queen's Hall Orchestra, London Symphony Orchestra, and the Royal Philharmonic Society



Queensferry. Seal of borough council

it was an important naval centre during the Great War. The buildings include the Norman church of Dalmeny, the town or public hall, and a memorial hall built by Lord Rosebery in memory of his wife. Near are Dalmeny and Hopetoun House, seats of the earl of Rosebery and the marquess of Linlithgow; also Barnbougle and Dundas Castles. The name is due



Queen's Hall, London. Principal entrances from Langham Place

are held here, as are the popular promenade concerts, long conducted by Sir Henry J. Wood (q.v.).



Queen's County, Ireland. Map of the Leinster county

Queen's House. Building in Chelsea, London. It is No. 16, Cheyne Walk, and owes its name to Catherine of Braganza, although not built until after her death. It was here that Dante G. Rossetti formed his menagerie. Another Queen's House was at Greenwich, designed by Inigo Jones for Anne of Denmark, and now part of the Royal Hospital School.

Queensland. State of the Australian Commonwealth, the largest and most northerly of the three eastern states.



Queensland arms

More than two-thirds of its area is within the tropics. Off the N.E. coast from 30 to 75 m. distant lies the Great Barrier Reef, a continuous coral formation except opposite the river mouths; the E. side of the reef descends steeply, the W. side gently to a depth of some 60 ft. The rivers fall into three groups. The Fitzroy, Burdekin, and smaller streams, e.g. the Brisbane, flow to the E. coast; the Flinders, the largest river in the state, and Mitchell flow into the Gulf of Carpentaria; Cooper's Creek and other streams drain S.W. to the area of internal drainage in the heart of the continent. The Great Dividing or Main Range is continued N. from New South Wales at a lower elevation. The highest peak in Queensland is Mt. Bartle Frere, 5,438 ft.

Varying in temperature between 60° and 80° F., Queensland has usually rainless winters and rainy summers. The S.W. is arid, semi-desert scrubland, the W. slopes are grassland or savanna where eucalypts alternate with scrub, the E. slopes are forested mainly with eucalypts, and the coasts are heavily forested with typical mangrove swamps along the shore. Much of the W. falls within the area where underground water is tapped by artesian bores.

Sheep rearing is important on the downs in the S. and in the S.W. to the N.W. of Charleville. Cattle are the main live stock; they thrive on all the coast lands, and the dairy products, butter and cheese, are important. The chief crops are maize, sugar canes, and tropical fruits, such as bananas and pineapples, while the tobacco and cotton crops are increasing. Gold and tin are mined in considerable quantities, and copper, manganese, and iron ores obtained. Coal mined at Ipswich and other centres is mainly used as bunker coal on the coasting steamers. Thursday Island is a centre for the pearl and bêche-de-mer fishery. Manufactures are confined almost entirely to the production of food-stuffs and articles of clothing.

Normanton, Cooktown, Cairns, Townsville, Mackay, Rockhampton, Maryborough, and Brisbane are termini of rly. lines. It is proposed to connect Charleville to Camooweal with an inland line across the W. Such a line would



Queensland. Map of the most northerly state of the Australian Commonwealth

ultimately join all the inland termini and would be extended to Darwin, and so make a transcontinental route. A number of important power and irrigation schemes are being undertaken. The former are in connexion with Barron and neighbouring rivers and a combined irrigation and power scheme is that on the Upper Dawson river. The governor, appointed by the British Government, is assisted by a prime minister and cabinet and legislative assembly of 72 members elected for 3 years on an adult suffrage. The upper house was abolished in 1921. Although Torres, Capt. Cook, and Flinders visited the coasts, the country was practically re-discovered by Oxley in 1823; by

1859, when the colony was separated from New South Wales, the pop. numbered 25,000, and rapid progress followed the gold discoveries, 1866-79. Area 670,500 sq. m. Pop. 756,000. See Aborigines; Australia; consult also

Mining History of Queensland, C. Parker, 1908; Queensland, Politics during Sixty Years, C. A. Bernays, 1919.

Queensland, UNIVERSITY OF. Australian university, situated at Brisbane. It was established in 1909 as a university for the state. The buildings, which face the river at Brisbane, include the library and the central technical college, in addition to class rooms, laboratories, etc. In connexion with the university are five residential colleges, four belonging to religious denominations, and one for women. The senate is the governing body; the faculties are arts, science, law, medicine, engineering. Sir Samuel McCaughey left over £200,000 to the university.



Queensland University. College buildings at Brisbane

Queen's Park. Suburb of Glasgow, Scotland. Noted for its football club, it contains a recreation ground and a museum. Pop. 13,000. See Glasgow.

Queenstown. Urban dist., market town, and seaport of co. Cork, Ireland. It is situated on the S. side of Great Island in Cork Harbour, 13 m. S.E. of Cork, with a station on the G.S. & W. Rly. It stands on the slope of a hill with the streets arranged in terraces; the finest building is the Roman Catholic cathedral of the diocese of Cloyne. Queenstown owes its importance to its position fronting the entrance to Cork Harbour. It is a naval station, a pleasure resort, and a yachting centre. Queenstown was known as Cove of Cork until, after a visit paid in 1849 by Queen Victoria, it was given its present name. Market day, Sat. Pop. 8,200. See Cork.



Queenstown arms

Queenstown. Town of Tasmania, Australia. It stands on the Queen river, 23 m. from Strahan, its port. The terminus of the Mt. Lyell Company's rly., it contains reduction works for copper mined at Mt. Lyell, saw-mills, and brick-works. Pop. 3,800.

Queenstown. Town of the Cape Province, S. Africa. It stands on an elevated plateau, 3,500 ft. high, between the Stormberg and Katberg Mts. and near the Great Kei river. It is on the rly., 154 m. from East London. There is a botanic garden. The town is the centre of a district producing wheat and wool. Queenstown, founded in 1853 and named after Queen Victoria, is laid out in the form of a hexagon. Pop. (whites) 4,500.

Queen's University, BELFAST. Irish university. Founded in 1909, it was formerly Queen's College, which, established in 1849, was one of the three colleges in the Royal University of Ireland. The Royal University was dissolved in 1909, when Queen's College itself was made a university. It has five faculties—arts, science, law, medicine, and commerce—and admits women equally with men to its classes and degrees. The university is entirely non-residential, and affiliated to it are the Municipal Technical Institute, Belfast, and the Royal College of Science, Dublin.



Queen's University, Ireland, arms

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Queen's University. Canadian university at Kingston, Ontario. It was founded in 1841 by members of the Presbyterian Church, and was at first mainly a theological centre. In 1854 a faculty of medicine was added to the existing ones in arts and theology. In 1912 the faculty of theology became a separate theological college, controlled by the Presbyterian Church, but united to the university. The university includes a school of mining, founded in 1893. The buildings include a valuable library, several museums, an observatory, and laboratories. The governing body is a board of trustees. The degrees are open to men and women.

Quelpart. Island belonging to Korea (Chosen). Situated at the



Queenstown, Ireland. The harbour, looking towards the entrance. Top, right, the Roman Catholic cathedral of S. Colman, begun in 1868 and consecrated in 1919. It was designed by Pugin

S.W. entrance of the Strait of Chosen, 53 m. S. of the S. extremity of Korea, it is a rock-bound island, encompassed by islets, and measures 45 m. in length and 21 m. in breadth. Its surface is hilly and well forested, Mt. Auckland, the culminating height, reaching to about 6,500 ft.

Quentin Durward. Romance of France and Flanders in 1468, by Sir Walter Scott, the seventeenth

of the Waverley novels, published in June, 1823. It was the first novel in which Scott ventured on foreign ground, and is one of the finest romances in the language. The titular hero is a young Scot who seeks his fortune in France, becomes a member of the King's Scottish guard, champions the young and beautiful Isabelle de Croye, and by his good sense, firmness, and gallantry is put in



Queen's University, Belfast. Main buildings, known formerly as Queen's College

possession of wealth, rank, and beauty. King Louis XI, Charles the Bold, duke of Burgundy, William de la Marek, Cardinal Balue, and Philippe de Comines are fine portraits, and the Bohemian scenes are noteworthy.

Quercus. Generic Latin name for the oak (*q.v.*).

Querétaro. Interior state of Mexico. Part of the plateau of Anahuac, it is situated between Hidalgo and Guanajuato, and covers an area of 3,556 sq. m. The N. part is mountainous, but elsewhere there are fertile valleys producing maize, fruit, sugar, and cotton. Mining is carried on. Pop. 247,000.

Querétaro. City of Mexico. Capital of the state of the same name, it stands on a plateau 6,170 ft. high, 110 m. N.W. of Mexico City on the National Rly. Water is brought to the city by a Spanish aqueduct of 74 arches, 80 ft. high. The movement for independence began at Querétaro, and here, in 1867, the emperor Maximilian was shot. The Maximilian chapel was erected in 1901. Pop. 33,000.

Querfurt. Town of Prussia, in Saxony. Situated on the Querne, a tributary of the Saale, on the branch rly. to Merseburg, it possesses a Romanesque church and a castle dating from the 14-15th centuries. There are sugar refineries, cotton factories, breweries, and a horse market. Before 1635 Querfurt was the capital of a little independent state. In 1635 it became part of Saxony and in 1815 part of Prussia. Pop. 4,900.

Quern (A.S. *cueorn*, akin to corn). Primitive grain-mill, usually of stone. In neolithic times—early



Quern, a primitive form of grain-mill

Egypt, Palestine (Deut. xxiv, 6), ancient Mexico (metate)—an oval grinder was rubbed upon a saddle-stone. Irish bullans and rock-basins mark the transition to the pair of disks, the nether with a vertical spindle engaging in a funnel-shaped hole through the upper, rotated by a wood handle. The word is in the name of some old London churches, e.g. St. Michael-le-Querne (corn market).

Quero. Village of Belluno, N. Italy. It is on the Piave, about 12 m. S. of Feltre. Here on Nov.

13, 1917, the Austrians were repulsed by the Italians, but the village subsequently fell to them. On Oct. 30, 1918, the British and Italians entered it. See Piave, Battles of the.

Quesnay, François (1694-1774). French economist. Born June 4, 1694, at Méré, in the dept. of Seine-et-Oise, the son of a small landed proprietor, he came to Paris and studied surgery and medicine,



Querétaro, Mexico. Part of the ancient Spanish aqueduct which supplies the city with water

becoming court physician to Louis XV in 1752. He is best remembered for his writings on political economy. His *Tableaux Économiques*, published at Versailles, 1758, and rediscovered, 1890, made him the leader of the Physiocrats (q.v.). Adam Smith in *The Wealth of Nations* (Book iv, ch. 9) devotes considerable space to Quesnay's theory. Quesnay contributed articles to the *Encyclopédie*. His collected works were published by A. Oncken, 1888. He died Dec. 16, 1774. See Political Economy. Pron. Kay-nay.

Quesnay de Beaurepaire, Jules (b. 1838).

and judge. Born at Saumur, he turned to the law after some experience as a journalist, and became successively avocat-general in Paris and, in 1893, president of the court of cassation. He was particularly prominent during the Boulangist agitation. He resigned in 1899 on account of disagreement with his colleagues over the



François Quesnay, French economist

After Vigneron

reinvestigated Dreyfus case. Quesnay's works, mostly issued under the pen-name of Jules de Glouvet, include *Histoire du Vieux Temps*, 1865, now ed. 1889.

Quesnel, PASQUIER (1634-1719). French theologian. Born in Paris, July 15, 1634, and educated at the Sorbonne, he entered the Congregation of the Oratory in 1657, and was ordained priest in 1659. The Jansenist tone of the first part of his *Réflexions morales sur le*



Pasquier Quesnel, French theologian

Nouveau Testament, 1671, and the Gallicanism of his edition of the works of Leo the Great won for him the enmity of the Jesuits. Refusing, in 1684, to sign the anti-Jansenist formula, he had to flee to Brussels, where the first collected edition of the *Réflexions* appeared in 1687. Quesnel was imprisoned in 1703, but escaped to Amsterdam, where he resided until his death, Dec. 2, 1719. An English edition of the *Réflexions* appeared in 1719-25. See *Les Derniers Jansénistes*, L. Séché, 1891. Pron. Kaynel.

Quesnoy. Name of several villages of France prominent in the Great War. Those in the depts. of Nord and Pas-de-Calais are usually known as Le Quesnoy (q.v.). Quesnoy-sur-Deûle is 6 m. N.W. of Lille, on the Lille-Ypres road. Quesnoy-en-Santerre is in the dept. of Somme, and is so called because it is on the Santerre plateau. It lies slightly N. of the Amiens-Roye road, 4 m. W. of the latter. See Somme, Battles of the.

Quest. British exploration ship. Built in Norway, 1917, of oak, pine, and fir, she was specially constructed for voyaging in Arctic waters, and was at first used as a



Quest. The vessel in which the Shackleton-Rowett Antarctic expedition sailed, Sept. 24, 1921

sealer in the White Sea. She was 111 ft. long, 23 ft. in beam, and about 200 tons net burthen. Her sides were 2 ft. thick of solid oak, sheathed with steel. In 1921, after being altered and refitted at Thornycroft works, Southampton, she was used to convey the Shackleton-Rowett Antarctic expedition party. Accommodation for the scientific staff and laboratories was built above and below decks, and platforms were erected for sounding machines. She returned to England on the abandonment of the expedition, 1922. *See* Antarctic; Shackleton, Ernest.

Quetta. Capital of Baluchistan. The town is situated 5,500 ft. above sea level among the mts. in British Baluchistan, and is a military outpost N.W. of, and guarding, the Bolan Pass, through which the strategic rly. from Quetta goes to the Indus valley. It is W. of the Harnai Pass, which also carries a strategic rly. From Quetta one rly. goes to Chaman on the Afghan frontier, overlooking the plains of Kandahar, and a second line goes to Nushki and then farther W. to the Persian frontier at Mirjawa. The town is a trade centre, but the winter cold drives away about a quarter of the population. Its growth dates from 1876, when the residency was established here. Pop. 34,000

Quetta Pishin. Dist. of British Baluchistan. It extends E. from the frontier of Afghanistan and is very mountainous, culminating in 11,700 ft. The rainfall varies from 6 to 10 ins. annually. It is crossed by the rly. from Quetta to Chaman through Pishin. The people are nearly all Pathans; there are a few Brahui in the S.W. Area, 5,220 sq. m. Pop. 128,000.

Quetzal OR **QUEZAL** (*Pharomacrus mocinno*). Bird of the trogon family, inhabiting the central American uplands from Guatemala to Panama. Distinguished by resplendent plumage, its name is derived from an ancient Nahuatl word meaning green-feather. The cock bird, the size of a dove, is adorned with carmine breast-feathers and upper tail-coverts of metallic green, projecting one to three ft. beyond the tail.

The ancient Mexican chiefs for bade the killing of the birds, whose plumes were plucked and sent to them as tribute for their personal wear on head-dress and mantle. The plumes were preserved as heirlooms, and representations of them occur on Maya pottery, sculpture, and picture-writings. The bird forms part of the national arms of modern Guatemala. *See* Birds, colour plate.

Quetzalcoatl.

One of the chief gods of ancient Mexican mythology, god of the air and of wisdom, and teacher of the arts. His name signified serpent clothed with green feathers. He was said to have ruled in Mexico in a time of peace and



Quetta, Baluchistan. The fort which guards the Bolan Pass; top, right, the church of S. Mary of Bethany

plenty, and when driven away by the sorceries of a rival, he said that he would return; a legend which proved helpful to Cortés, who may well have seemed to a superstitious people the returning god. *See* Mexico.



Quetzalcoatl. Image of the Mexican god

other place of entertainment; also to intending passengers at a rly. booking office, or waiting for a tram or omnibus. In this last connexion the custom was more common on the continent of Europe than in Great Britain until the congestion of traffic caused by war conditions made its adoption advisable at certain points. The Great War also, particularly before rationing was introduced, was responsible for the formation of queues before food shops. The term queue was used in the meaning of pigtail in the days when the hair was still powdered. *Pron.* Kew.

Quevedo y Villegas, FRANCISCO GOMEZ DE (1580-1645). Spanish scholar and courtier. Born

at Madrid, he was educated at Alcalá University, where he distinguished himself as a scholar. For some years he was attached to the court of the king of Spain, and later was secretary to the viceroy of Naples. In 1621 he returned to Spain, where he resided at the court, and amused

himself and others by a constant succession of writings, many of them satirical.

On a charge of having libelled the king he was imprisoned in 1639. Released in 1643, he died Sept. 8, 1645.

Quevedo wrote poems, philosophical and political treatises, satires, and stories. The *Visions*, translated into English, is perhaps his best known work.



Francisco Quevedo y Villegas
After Velasquez

Quezaltenango. Dept. of S.W. Guatemala, Central America. It is bounded S. by the Pacific Ocean, is mountainous, and contains the active volcano Santa Maria, 12,355 ft. in height. The chief products are coffee, sugar, rubber, wheat, maize, and cattle. Pop. 120,000. Quezaltenango, the capital, lies 75 m. W.N.W. of the ruined capital, Guatemala la Nueva. It is built on a plateau near the volcanoes Cerro Quemado and Santa Maria, at an alt. of 7,700 ft. The second largest town in the republic, it manufactures cotton, linen, and woollen goods, and trades in agricultural produce. Pop. 28,900.

Quia Emptores (Lat., whereas buyers). Opening words, used as the name of an English law passed in 1290. It was directed against the alienation by the lords of parts of

their land and the consequent creation of fresh manors, a practice which tended to reduce the chances that such land would revert, owing to the failure of heirs or for other causes, to the king or other overlord. The law of 1290 provided that if a lord alienated some of his land, the new tenant would hold such land direct from the overlord, to whom it would return in case of escheat.

Quiberon. Town of France, in the dept. of Morbihan. It stands at the S. extremity of a peninsula which forms the W. land boundary of the Bay of Quiberon, 21 m. S.W. of Vannes. The peninsula is connected with the mainland by a sea-wall, and is defended by Fort Penthièvre. A railway runs along the peninsula to the junction at Auray. At St. Pierre, on the E. coast, are menhirs and dolmens, and at the N.W., on the mainland, are the remarkable prehistoric monuments of Carnac (*q.v.*). There are two harbours, Port-Maria and Port-Haliguen, whence, during the summer months, steamer connexion is kept up with picturesque Belle-Ile-en-Mer (*q.v.*), where Sarah Bernhardt transformed an old fort into a villa residence.

Quiberon is a convenient point from which to visit the gulf of Morbihan (*q.v.*), which is almost landlocked by the peninsulas of Rhuis and Locmariaquer, the channel between which is only half a mile wide. There are firm, fine sands, and a small bathing establishment. On June 14, 1795, some thousands of French emigrés were landed by a British fleet at Carnac. They hoped to join the peasant revolt against the Convention. There were some veteran Chouan troops under Sombreuil, but the raw volunteers lacked discipline and adequate leadership. Much time was lost in disputes, and though the men fought gallantly at Quiberon and Fort Penthièvre, they were defeated by Hoche, a storm preventing the English vessels from rendering much aid. Sombreuil and about 900 survivors surrendered under the mistaken impression that their lives would be spared. Sombreuil, Mgr. de Hercé, bishop of Dol, and 20 others were shot at Vannes; the rest in the Champ des Martyrs at Auray.

Quiberon Bay, BATTLE OF. Fought between the British and the French, Nov. 20, 1759. During the Seven Years' War the French planned an invasion of England. An army was assembled under the duc d'Aiguillon, which was to embark at Vannes, conveyed by the fleet of Conflans, while a squadron under Thurot, making a diversion

against the coasts of Scotland and Ireland, decoyed the English Channel fleet away.

De la Clue was attempting to join Conflans at Brest, but was utterly defeated by Boscawen on Aug. 18. Meanwhile the troops had been assembled in the neighbourhood of Quiberon, and on Nov. 14 Conflans put to sea from Brest to safeguard the transports if he could. Hawke had been driven to Torbay by a great gale, but the wind that enabled Conflans to get out from Brest brought Hawke also to sea. Quiberon Bay lies about 150 m. S.E. of Ushant, and is protected on the W. and S.W. by the Quiberon peninsula, Belle Isle, and the dangerous rocks of the Cardinals. There Conflans hoped to remain until another gale should blow Hawke from his blockading station to shelter.

Conflans, making his way to Quiberon, did not suppose that his adversary would risk his fleet amid uncharted and dangerous rocks, with a gale blowing, on a grey day in Nov. But Hawke had measured the hazard. The signal was hoisted for a chase, and the English pressed on through the islands and shoals and towards a lee shore, and, ranging on both sides of the fleeing French, each ship fired her broadside and left the destruction to those who followed. English ships were lost on the rocks, but the French fleet was utterly broken, some ships were captured, others lost or struck, and the flagship, *Soleil Royal*, was driven on shore and burned. Hawke's victory, which was without precedent, was complete; the French plan of invasion was shattered and the English command of the sea assured.

Quiché or **KICHÉ.** American Indian tribe of Maya stock in S. Guatemala. Now agricultural peasants, they were at the Spanish conquest the most powerful tribe in Guatemala, with a fortified capital at Utatlan. The allied Cakchikel were S.E. of them. In the 17th century a Christianised Guatemalan wrote in Quiché from local tradition an epic entitled *Popol Vuh*, recounting early migrations and tribal history. See *Maya*.

Quichua. South American Indian tribe and stock in Ecuador, Peru, and Bolivia. In the 13th century, led by the Inca clan, they absorbed earlier cultures established by the coast Yunca near Truxillo and by the upland Aymara or Colla round Lake Titicaca. At the Spanish conquest they ruled from Ecuador to Chile, a region 2,500 m. long, with cultural offshoots as far as the Argentine Calchaqui. The llama was domesticated for trans-

port, the alpaca for wool. The political system was a state socialism under the autocratic rule of the Inca as priest-king. Roads and bridges betokened a highly systematised government, whose records were kept by quipus or knotted cords. The language is spoken to-day, from Quito to Argentina, by more than 2,000,000. It has given to Europe words like condor, guano, pampa. See *Bolivia*.

Quickening. First perception by the mother of the movements of the foetus while in the womb, generally felt about the end of the fourth month of pregnancy. According to English law, when a woman who is "quick with child" is sentenced to death, the execution of the sentence must be postponed until after the birth of her infant. Formerly a jury composed of matrons was empanelled in such cases to determine whether or not quickening had occurred. Such a jury is still legally required, but the matrons are now assisted by a doctor. See *Pregnancy*.

Quicklime. Common name for calcium oxide, CaO. It is prepared on a large scale by burning limestone (calcium carbonate) mixed with coal in kilns. The limestone loses its carbonic acid gas during the process. The lime-burning process is a continuous one, the limestone and coal being placed in the top of the kiln and the quicklime raked out at the bottom when sufficiently burnt.

Quicklime is employed for making mortar and cement for building purposes, and the product made in the manner stated varies according to the quality of the limestone used. The builder distinguishes the quicklime obtained from a pure limestone as "fat," while that from limestone containing magnesia is spoken of as "poor" lime. Slaked lime is made from quicklime by pouring water over it, much heat being evolved during the process. The product known chemically as calcium hydroxide is used for making lime-water and in chemical industry.

Quickly, MISTRESS NELL. Character in Shakespeare's *King Henry the Fourth*, *King Henry the Fifth*, and *The Merry Wives of Windsor*. In *King Henry the Fourth* she is the hostess of the Boar's Head, Eastcheap. In *The Merry Wives* she is the housekeeper of Dr. Caius, the confidant of Anne Page's three lovers—Slender, Dr. Caius, and Fenton—and the go-between in the intercourse of Falstaff with Mistress Ford and Mistress Page. In *King Henry the Fifth* she has become the wife of Pistol, describes Falstaff's death, and dies in the Spital.

Quick Match. Simple fuse which burns rapidly and can be used for the ignition of gunpowder and similar explosives. It is generally prepared by boiling loose strands of cotton wick in a strong solution of gunpowder and gum, allowing them nearly to dry, and then, whilst they are "tacky," dusting them over with mealed gunpowder. If unconfined this material burns at the rate of about twelve seconds per yard, but if enclosed in a tube burns much faster. Formerly it was used for both military and industrial blasting, but for this purpose has been entirely superseded by electric detonators, safety fuse, etc. It is now chiefly employed for fireworks, and to convey ignition rapidly to various components in certain types of shell.

Quicksand. Name given to a loose sand in which heavy bodies easily sink. Such sands are composed of small particles and water and do not coalesce under pressure. They are most usually found near the mouths of rivers and in glacial deposits, and are generally small in extent. A heavy body on a quicksand behaves, as regards sinking, very much as it does in any fluid. If animals and human beings did not struggle when caught in one it is probable that they would not sink completely.

Quicksilver. Old English term, still used, for the metal mercury (*q.v.*). It was obviously suggested by the resemblance of mercury to silver and by its extraordinarily mobile character.

Quietism. Form of mysticism which has arisen at various times and in various branches of the Church. Its distinctive principle is passivity and dependence on the manifestation of the Will of God as a guiding rule of life. Hence the Quietist practises entire resignation of self in thought, desire, and deed, and in this way seeks such union with God that the Will of God shall take the place of his own will, and his life be identified with the divine operation. Quietism has arisen in connexion with various systems of philosophy and with several non-Christian religions, such as Buddhism. Meditation is the one essential practice of Quietism, but it differs from what is usually known by that term.

Christian meditation is an active mental process by which some doctrine or fact is recalled by the memory, reflected upon by the imagination, apprehended by the reason, and its lessons accepted by the will and adopted in the life. Quietism, on the other hand,

teaches that meditation is not an act of the memory and reason, but is an inward, passive apprehension resulting from union with God apart from any exertion of the mind. It may be described as a kind of mental sleep which tends to self-hypnotism.

The name Quietism first came into use through the teachings of a Spanish priest, Miguel de Molinos (*q.v.*), whose book, *The Spiritual Guide*, published in 1675, ran through twenty editions in various languages in six years, and made converts of many eminent Roman cardinals and prelates. It was published in English in 1699.

Madame Guyon taught Quietism in France and was imprisoned for it in 1688 and again in 1695. She influenced Fénelon and gained adherents in France and Switzerland, but was strongly opposed by Bossuet. In Great Britain Quietism never made considerable headway, but the "inward light" of the Quakers has points in common with it. The objections raised by orthodox theologians to the system are that it tends to supersede faith in the Christian verities and to depreciate good works, and even constitutes a danger to souls by rejecting all exertion in religion, and entirely excluding any struggle against evil habits or endeavour to attain good ones, or to help one's fellows. See Hesychasts; Mysticism; consult also Molinos the Quietist, J. Bigelow, 1882; Christian Mysticism, W. R. Inge, 1899.

Quilimane, KILIMANE, OR QUELIMANE. Port in Portuguese East Africa. It is situated N. of the delta of the river Zambezi and 313 m. S.W. of Mozambique. It possesses an excellent harbour, but is at present undeveloped, although an important rly. is being constructed to the Nyasaland Protectorate. Pop. 2,000, including about 400 Europeans.

Quill (Mid. E. *quille*, feather; etym. doubtful). Word used in several senses. (1) A piece of small

tube or reed used by weavers to wind thread upon, and by others to carry wound silk or other thread. (2) A plectrum of quill, as of a goose, for plucking the strings of a musical instrument of the zither type. In an instrument of the harpsichord type, a piece of crow-quill, fixed on a jack, set in motion by the keys. (3) A small pipe or tube, particularly a small water pipe. (4) The hollow shaft of a seal engraver's lathe, in which the cutting tools are held during their rotation, the stones being held against them. (5) In mining, a quill is a train for igniting a blast. It comprises a quill filled with slow-burning powder, but is now superseded by a safety fuse. (6) The float of a fishing line. (7) A faucet or tap, as of a barrel. (8) A pen for writing, made by sharpening and splitting the hollow stem of a feather. The spines of hedgehogs and porcupines are called quills. * See Pen.

Quiller-Couch, SIR ARTHUR THOMAS (b. 1863). British novelist and critic. Born at Fowey, Cornwall, Nov. 21,



1863, he was educated at Clifton and Trinity College, Oxford. He achieved great success with his first novel, *Dead*

Arthur Quiller-Couch

Man's Rock, 1887, written under the pseudonym of Q, and enhanced his reputation with many novels and stories. These include *The Astonishing History of Troy Town*, 1888; *The Splendid Spur*, 1889; *The Blue Pavilions*, 1891; *The Delectable Duchy*, 1893; *The Ship of Stars*, 1899; *Fort Amity*, 1904; *Major Vigoureux*, 1907; and *Nicky Nan, Reservist*, 1915. His earlier writing was much under the influence of R. L. Stevenson, and in 1897 he was entrusted with the task of completing Stevenson's unfinished novel, *St. Ives*, pub. 1899.

Sir A. Quiller-Couch's fine literary taste and judgement are strikingly manifested in his critical studies, such as *Adventures in Criticism*, 1896, and in his anthologies, *The Oxford Books of English Verse*, of Ballads, and of Victorian



Quilimane, Portuguese East Africa. The Town Hall

Verse. Knighted 1910, in 1912 he was made King Edward professor of English Literature at Cambridge, his lectures, e.g. *On the Art of Writing*, 1916, and *On the Art of Reading*, 1920, circulating widely in volume form. *Pron.* Cooch.

Quillota. Town of Chile, in the prov. of Valparaíso. It stands in a fine position on the river Aconcagua, 26 m. by rly. N.E. of Valparaíso, and is the centre of a copper mining and fruit and wine producing district. Pop. 11,400. *Pron.* Keel-yō-ta.

Quillwort OR **MERLIN'S GRASS** (*Isoetes lacustris*). Aquatic perennial herb of the natural order Selaginellaceae. It is a native of Europe, W. Siberia, and N. America. It grows at the bottom of lakes, and has a broad, flat, corm-like base, from which spring a dozen or twenty stiff awl-shaped leaves, which are composed internally of four tubes with transverse partitions. The spore-capsule is borne on the dilated bases of the outer leaves.



Quillwort or
Merlin's Grass

The spore-capsule is borne on the dilated bases of the outer leaves.

Quilon. Town of Travancore, India. It is situated on the coast of the Arabian Sea, on one of the numerous backwaters which characterise this coast. Here the rly. from Trivandrum, 35 m. to the S.E., to Tinnevely and Madras leaves the coast. Coasting steamers make use of the backwaters and reach the town to take away for export copra, coffee, and spices. In the early days of Indian trade the town was one of the chief ports of the W. coast of the Deccan. In 1503 it was Portuguese, and in 1653 it was taken by the Dutch. Pop. 15,700.

Quilp, DANIEL. Character in Dickens's novel *The Old Curiosity Shop*. A hideous and cruel dwarf with a mind as distorted as his body, he practises usury, one of his victims being Little Nell's grandfather. In the end he is drowned in the Thames while trying to evade the police.

Quilt (Lat. *culcita*, mattress). Bed-cover of down or other soft material enclosed in a fabric case. Quilting was formerly done with the needle, a layer of wadding interposed between upper and lower layers of cloth being stitched to form patterns standing in some relief. Loom quilting followed, a



Quimper, Brittany. Gothic cathedral of S. Corentin, from the north

series of thick wadding threads replacing the loose fibre used as stuffing. A great diversity of complex weaves are used in quilt weaving, upper and lower fabrics being woven simultaneously in the loom, while threads from the bottom fabric combine the two together; the Marseilles quilt is of this type. The satin quilt has a smooth surface with raised figures, and is made by the interplay of two separate sets of warp and two of weft. The Alhambra quilt is of rather simpler construction. The honeycomb quilt is a single fabric with a honeycomb pattern in low relief, and often with additional geometrical or floral figures. The tapestry quilt is a coloured one in which weft of different colours is brought into play. Quilt weaving is done mainly in cotton, chiefly around Bolton and Bury, Lancashire.

Quimper. Town of Brittany, France, and capital of the dept. of Finistère. It stands on the



Daniel Quilp and Dick Swiveller. From a drawing by Charles Green

river Odet, 36 m. S.E. of Brest. The cathedral of S. Corentin, the first stone of which was laid by Bertrand de Rosmadec in 1424, is one of the finest Gothic churches in Brittany, with beautiful lady chapel, fine choir, stained glass, mural paintings, and statuary. The ornate High Altar is modern, as are the spires in the towers. There are potteries, shipbuilding yards, weaving and paper factories, and iron and copper foundries. The museum has a good collection of paintings and other exhibits of interest. There are a coasting trade and sardine fisheries. The town was besieged several times by the British. In 1345 it was destroyed by Charles de Blois. During the Revolution it was known as Montagne-sur-Odet. It is the birthplace of Laennec (1781-1826), inventor of the stethoscope. In early times Quimper was the capital of Cornouailles. Pop. 21,000.

Quimperlé. Town of Brittany, France, in the dept. of Finistère. It stands at the confluence of the Ellé and the Isole, 92 m. S.E. of Brest. The church of S. Michel dates from the 14th-15th centuries, and that of Ste. Croix, restored 1862, is modelled on the church of



Quimperlé, Brittany. Church of S. Michel, on the right side of the stream, formed by the junction of the Ellé and the Isole

the Holy Sepulchre at Jerusalem. Trade is carried on in wood, grain, cattle, butter, wax, honey, and hides. The place was known in the sixth century, when Gonthiern, a king of Cambria, after abdicating his throne, built a hermitage at the confluence of the two rivers. This was transformed in the 9th century into an abbey, around which grew the modern town. Quimperlé dates its importance from 1271. Pop. 8,700.

Quin, JAMES (1693-1766). English actor. Born in London of Irish descent, Feb. 24, 1693, and educated in Dublin, he came into notice by his rendering of Bajazet in *Tamermore* at Drury Lane Theatre, London, 1715, and by killing a fellow actor in a duel. For many years he



James Quin,
English actor
After Hudson

played leading parts at Lincoln's Inn Fields and Covent Garden. In 1746 he challenged comparison with Garrick, when he appeared as Horatio to his *Lothario* in *The Fair Penitent*, as *Falstaff* to his *Hotspur* in *Henry IV*, and as *Gloster* to his *Hastings* in *Jane Shore*, both actors also impersonating *Richard III*. He retired from the regular stage in 1751, and died at Bath, Jan. 21, 1766. There is an anonymous *Life*, 1766, reprinted in revised form, 1887.

Quince. Trees and shrubs of the natural order *Rosaceae*, genus *Pyrus*. Natives of Europe, Japan,



Quince. Branch with leaves and fruit; inset, flowers

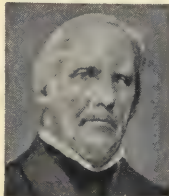
and China, the common species was introduced into Britain in 1573. They vary in height from 5 to 20 ft., and are readily propagated by layers or suckers in autumn. Quinces flourish in moist soil, and the pear-shaped, astringent, yellow fruit is used in jellies.

Quincunx (Lat.). Arrangement of five things, one in each corner and one in the centre of a square or oblong space, as in playing-cards or dice. The term is applied to trees arranged in an orchard so that those in one row face the spaces between those in the neighbouring row; also to a reliquary, the four outer parts of which, two on each side, close over the central part. In the fighting formation of the Roman legion the maniples are said to have been arranged in quincunx order.

Quincy. City and river port of Illinois, U.S.A., the co. seat of Adams co. It stands on the Mississippi river, here spanned by a fine rly. bridge, 265 m. by rly. S.W. of Chicago, and is served by the Chicago, Burlington and Quincy and other rlys. Manufactures include stoves, pumps, boots and shoes, machinery, and show-cases. Settled in 1821, Quincy was incorporated, 1834, and received a city charter, 1839. Pop. (1920) 36,000.

Quincy. City of Massachusetts, U.S.A., in Norfolk co. It is situated 8 m. from Boston and 1½ m. from the sea on the New York, New Haven and Hartford Rly. Quincy granite is exported in large quantities; the horse-rly. made 1826-27 to transport the granite for the Bunker Hill monument was the first rly. in the U.S.A. The city manufactures boots and shoes, soaps and chemicals, has a boat-yard, and contains the Adams Academy and the Woodward Institute. The old Quincy House, a fine specimen of colonial architecture, is a museum of Colonial and Revolutionary antiquities. John Hancock, John Adams and his son John Quincy Adams were natives. Settled in 1625 as Mt. Wollaston, and one of the oldest settlements in the state, it took its present name in 1792 and obtained a city charter in 1888. Pop. (1920) 48,000.

Quinet, EDGAR (1803-75). French author. Born Feb. 17, 1803, at Bourg-en-Bresse, Ain, after



Edgar Quinet,
French author

extensive travels he was appointed professor in Lyons University and later in the Collège de France. An active Radical in politics, he was exiled after the *coup d'état*, 1851, but returned to France on the fall of the empire. As an historian he is romantic in style but philosophic in purpose, seeking, as in his *Révolutions d'Italie* and *La Révolution*, the inner significance of the facts presented. His other writings include a mystical treatise, *Du Génie des Religions*; *Ahasvérus*, a kind of allegorical miracle-play on the *Wandering Jew*; and the allegorical prose-epics, *Prométhée* and *Merlin l'Enchanteur*. He died at Versailles, March 27, 1875. See *Life*, R. Heath, 1881.

Quinine. Alkaloid present in the bark of *Cinchona succirubra*. The sulphate hydrochloride and acid hydrochloride are white crystalline salts used in medicine

in doses of 1 to 10 grains. Quinine is used in medicine to stimulate the salivary and gastric secretions in various forms of indigestion. Its most important use, however, is in malaria. A dose of 15 to 30 grains given before an attack is due may ward off the attack or cause it to be much milder. The drug appears to act as a direct poison to the malaria parasites which are present in the blood. Excessive doses of quinine produce ringing in the ears, giddiness, disturbance of vision, and headache. See *Cinchona*.

Quinn's Post. Name given in the Great War to a strong position in Gallipoli peninsula, a little to the north of Gaba Tepe (*q.v.*) and S.W. of the main masses of Sari Bair (*q.v.*). Here in May, 1915, the Anzacs were engaged in heavy fighting with the Turks. See Gallipoli, Campaign in; *Krithia*, Battles of; Australia and the Great War.

Quinoa (*Chenopodium quinoa*). Herb of the natural order *Chenopodiaceae*. It is a native of the



Quinoa. Foliage and flower clusters; inset, fruit

Pacific slopes of the Andes. It attains a height of 5 ft., with a stout, furrowed stem and somewhat triangular-oval leaves with sinuate margins. The small green, clustered flowers are succeeded by small fruits, each containing a single round, flattened seed. The plant is cultivated for the sake of these seeds, which are boiled to furnish a sort of gruel. Sometimes they are roasted before boiling.

Quinoline. Organic base originally prepared by distilling quinine with caustic potash. It also exists in coal-tar. It is a colourless, oily liquid with a faint aromatic odour recalling peppermint oil. Quinoline is made synthetically by heating a mixture of glycerin, aniline, nitrobenzene, and sulphuric acid.

Quinone. Organic compound first prepared by Woskresensky by oxidising quinic acid with manganese dioxide and sulphuric acid. It forms beautiful crystals, and its solution stains the skin permanently brown.

Quinquagesima (Lat. *quinquagesimus*, fiftieth). Term applied to the next Sunday before Lent. Quinquagesima Sunday falls 50 days before Easter. It was formerly known as Shrove Sunday.

Quinquennial (Lat. *quinque*, five; *annus*, year). Something occurring every five years. It is also used for a period of five years, which is more correctly a quinquennium. A quinquennial valuation is a re-valuation of property for the purpose of assessing it for rates, that takes place every five years.

Quinquereme (Lat. *quinque*, five; *remus*, oar). War vessel used in ancient times. The name is due to the fact that it had five banks of oars, one on top of the other. See Trireme.

Quinque Rue, LA. Village of France. In the dept. of Pas-de-Calais, it is 1 m. E. of Festubert, and was prominent in the fighting around that place in the Great War. See Festubert, Battle of.

Quinsy (late Lat. *quinancia*, from Gr. *kyon*, dog; *angkein*, to throttle). Acute inflammation of the tonsil, accompanied by supuration. See Tonsil.

Quintain. Instrument used during the age of chivalry in practising the knightly art of tilting with the lance. Originally a stout post, it was developed into a device for discomfiting the unskilled



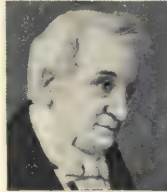
Quintain of a type formerly found on English village greens

man-at-arms. The humbler classes practised a similar variety of exercise, the target being so poised as to swing round and, unless skillfully evaded, deal a sharp blow from a sandbag hung from the other end of the crossbeam. This latter form of the sport was a popular amusement at country weddings as late as the 18th century. The word is derived from

Lat. *quintana*, the part of a Roman camp devoted to military exercises.

Quintal. Measure of weight used in Spain, Portugal, and other countries. In Spain it is 100 libras, or 101.4 lb., in Portugal 58.752 kilogrammes or 129.4 lb. The weight is also used in Argentina and other parts of S. America. The metrical quintal of France equals 100 kilogrammes or nearly 2 cwt.

Quintana, JOSÉ MANUEL (1772-1857). Spanish writer and republican reformer. Born at Madrid,



José M. Quintana, Spanish writer

April 11, 1772, and educated at Salamanca, he became a lawyer, and took an active part in politics. His *Lives of Celebrated Spaniards*, 1807-34, and his poetry stirred national sentiment, but his advanced political views involved imprisonment for several years. Restored to favour in 1820, he was made a senator, and died March 11, 1857. He wrote several tragedies, as well as biographies of Gonsalvo de Córdoba, known as El Gran Capitán (The Great Captain), and Pizarro.

Quintana, MANUEL (1834-1906). Argentine statesman. He studied law and practised as a lawyer, and was a professor before entering politics in 1860. Representing Buenos Aires in the legislature, he became a senator. He attended the Montevideo congress as Argentine plenipotentiary and was likewise at the Washington Pan-American congress of 1889. Minister of the interior, 1904, he was elected president in Oct., 1904, and proved an able statesman. An honourable and strong man, he was active in opening up new territory, improving communications, and in fiscal reform. He died, while in office, March 11, 1906.

Quintana Roo. Federal territory of Mexico. Organized in 1902, it is situated in the Yucatan peninsula, and is bounded E. by the Caribbean Sea. It is under the administration of the city of Mexico, and covers an area of 18,886 sq. m. The capital is Santa Cruz de Bravo. Pop. 9,400.

Quintet (Lat. *quinque*, five). Musical composition for five solo voices or instruments.

Quintilian (c. A.D. 35-97). Roman rhetorician. His full name was Marcus Fabius Quintilianus.



Quintilian, Roman rhetorician

Born at Calagurris in Spain, he was educated at Rome, and returned to Spain as a teacher of oratory. His great work in 12 books, *The Institutes of Oratory*, represents the fruit of some 20 years' experience, not only as professor of rhetoric, but also as a practical pleader in the law courts. The more technical portion of the work, which deals with the actual practice of public speaking, has now comparatively little interest, but the books which give an outline sketch of ancient literature are of great value.

Quintilian possessed a very fine sense of literary criticism, and his appreciations of the leading Latin and Greek authors are of great interest. The final book, which deals with education, is also of permanent importance. The broad and sane views which the author expresses on this subject anticipate some modern theories.

Quipu. Ancient Peruvian device of knotted strings for keeping records. In Quichuan it means a knot. From a stout cord depended a fringe of threads of different colours, sometimes with wood or stone pendants. The number and distance of the knots and the order of the threads arranged on a decimal system served to record the results of the royal Inca hunts, the number and composition of the llama herds, details of tribute, and matters of account connected with peace and war. Ultimate immigration from E. Asia is suggested by the occurrence of similar knot-records in the Pelew, Hawaiian, and other Polynesian islands. Andean Indians still use them.

Quire. Measure of paper, the twentieth part of a ream, i.e. 24 sheets. The term is used also for small books or pamphlets which contained a quire of paper. A newspaper quire contains 27 copies, a printer's quire 25 sheets. The word was formerly used for four sheets of paper or parchment folded to make eight pages, and was a unit of measurement in books.

Quirinal (Lat. *Collis Quirinalis*). One of the seven hills on which Rome is built, 170 ft. in height. Situate in the N.E. quarter, it was early seized by Sabines, and the name was popularly connected with Cures, an ancient Sabine town.



Quirinal, Rome. Main entrance to the royal palace. On the left are the fountain and obelisk, and two colossal statues of horse tamers

The modern palace erected on the summit was founded by Gregory III in 1574; since 1870 it has been a royal palace. *See* Quirites; Rome.

Quirites. In Roman history, originally the Sabine inhabitants of the Quirinal. After the union of Sabines and Romans the name was applied to the individual old citizens, all of whom bore arms; collectively, to all the citizens of Rome. Later, the term was used for civilians as opposed to soldiers, to whom it was a reproach to be called Quirites. The word has been derived from Lat. *quiris* (Sabine, *curis*, a lance), or from Cures, a Sabine town. *See* Rome; Sabines. *Pron.* Kwiri-teez.

Quirk. Term applied in architecture to the groove or channel which separates the convex part of a moulding (*q.v.*) from the fillet that covers it.

Quito. City of Ecuador, capital of the prov. of Pichincha and of the republic. Picturesquely placed amid lofty volcanic peaks, at an alt. of 9,350 ft., it is 164 m. direct and 297 m. by rly. N.N.E. of Guayaquil, and lies just below the equator. The seat of the archbishop of Ecuador, it has a cathedral, presidential and archiepiscopal palaces, a mint, monasteries, university, etc. Manufactures include saddlery, ponchos, carpets, cotton and woollen goods, jewelry, and articles of Mexican "onyx." Hides and rubber are exported, and a large trade is carried on in oil paintings of religious subjects. Quito was an Indian capital before its capture by the

Incas in 1470 and the Spaniards in 1534. It has suffered repeatedly from earthquakes and in the civil wars. Pop. 70,000. *Pron.* Kee-to.

Quit rent (Lat. *quietus*, free, at rest). Rent by which a tenant secures release from all other services. Under the ancient feudal manorial law the lord of the manor always had some servile tenants who held by copy

of court roll (copyholders) who were bound, in return for the land granted to them, to perform certain services so many days in the year, *e.g.* to plough the lord's land, to reap his harvest, and to manure his fields. In course of time copyholders began to pay a small fixed rent, so as to be quit of the services; and once this had become customary the lord could not demand the old services, but only the quit rent. Further, the amount of the quit rent could not be increased, so that to-day copyholders hold at a quit rent of a few pence which, when it was fixed, was worth forty or fifty times its present amount. *See* Copyhold; Manor.

Quiver (Old Fr. *quivre*). Sheath or case in which a bowman carried his arrows. *See* Archery.

Quoad Sacra (Lat., sacred thus far). Term used in Scottish local government. It describes parishes that are such for ecclesiastical purposes only, being thus different from civil parishes. They can be created under an Act of 1844.

Quodlibet (Lat., what pleases you). Old musical term for the simultaneous performance of a number of different melodies, either prepared and modified so as

to fit together, or more commonly sung extemporaneously. In the latter case the incongruity of the tunes and words gave rise to a certain amount of merriment, which was the end aimed at. The quodlibet was popular in the 16th and 17th centuries, and was a favourite pastime of the Bachs.

Quoich, Loch. Lake in the S.W. part of Inverness-shire, Scotland. It is 6 m. long by $\frac{1}{2}$ m. broad. It receives the river Quoich (8 m. long) from the W., and is drained E. to Loch Garry by the river Garry.

Quoin (Fr. *coin*, corner, wedge). In architecture, the stone block employed at the external corners of a building to emphasise its solidity and strength. A "rustic" quoin is roughened and raised above the general wall surface, so as to accentuate the differences between the former and the latter. The word is also applied to the wedge used for tightening or locking up forms in printing. *See* Forme; Masonry.

Quoits. Pastime which probably had its origin in England and Scotland in the 15th century. At the present day the game is played in Scotland, principally by members of the various curling clubs, and in England by the workmen of Lancashire and the Midlands; it also claims a certain number of devotees in the U.S.A. and Canada.

The playing area is formed of two beds of clay, each 3 ft. in diameter and generally situated 18 yds. apart from centre to centre. Into each centre is driven an iron pin, termed the hob, of which an inch remains exposed above the level of the ground. The quoit is a flattened ring of iron, thick at its inner and thin at its outer edge, not exceeding 8 ins. in diameter and usually weighing about 9 lb.

The object of the game is for the player, who stands at one end just outside the clay bed and in a line with the pin, to cast his quoit so that it falls over the pin at the far end—termed scoring a ringer—or as near to it as possible. Each player throws two quoits in succession, a ringer scoring two. Should neither player throw a ringer, the player whose quoits are nearest to the pin scores two; if only one of his quoits is nearest it counts one. If the two nearest quoits are at the same distance from the pin and belong to different players, neither scores. The players then throw to the other end, continuing until one of them has scored the number of points agreed upon for game.

Matches are played between single players or two on each side. All quoits which alight on their backs are foul, and in important



Quito. A hill-side street in the historic and picturesque capital of Ecuador

matches it is usual to reckon all quoits as foul which are more than 18 ins. from the pin.

Quorn. Premier English hunt. The name is taken from Quorndon in Leicestershire. The country hunted is regarded as the best country in England. It is about 20 m. by 20 m. in area, Loughborough being roughly its centre, although Melton Mowbray is more frequented as such. The kennels are near Barrow-on-Soar, and the hounds are the property of the members. The country is said to have been hunted in the latter part of the 17th century by Thomas Boothby with the first pack of foxhounds in England, but the pack was not definitely established until the 18th under the mastership of Hugo Meynell. Its masters have included some famous hunting men, among them Squire Osbaldeston, Assheton Smith, and the earl of Lonsdale. See Fox-hunting; consult also The Quorn Hunt and its Masters, W. C. A. Blew, 1898.

Quorndon. Village and urban dist. of Leicestershire, England. It stands on the Soar, 9 m. from Leicester and 2 m. from Loughborough, with a station, Quorn and Woodhouse, on the G.C. Rly. S. Bartholomew's Church, mainly an Early English building restored, has some interesting 16th century tombs. The village is the headquarters of the Quorn hunt. Pop. 2,400.

Quorra OR KWARA. Native name applied to the navigable section of the Niger river which flows through the Hausa country.

Quorum (Lat., of whom?). Term used for the minimum number of persons necessary to form a meeting, at which the business of a company, club, or other association is transacted. In the case of public companies the articles of association declare usually what is

by-law. In the British House of Commons the quorum is forty, and in the House of Lords it is thirty.

There is no general law on the subject of a quorum, but a proviso of this kind is necessary to prevent a mere handful of persons from binding the whole body by their action. In both chambers of congress of the United States and of the French parliament the quorum is a majority of the members of each house. The word was originally used in this sense in the commission appointing justices of the peace in England, and its later uses are derived therefrom.

Quota (Lat. *quotus*, how great?). In law, the proportion of a contribution, generally the proportion of a tax or levy by the crown. In England it was used for the number of men which the different towns and districts were expected to contribute to the armed forces, and also for the amount levied on the various localities on account of the land tax (*q.v.*). It is also used under a system of proportional representation (*q.v.*).

Quotation. Passage extracted from the speech or writings of another, and usually defined by quotation marks. There are many books of quotations. In some, where foreign authors are quoted, the original text is accompanied by a translation, as in H. T. Riley's Dictionary of Classical Quotations, the series of Beautiful Thoughts from Greek, Latin, French, Italian, German, and Spanish Authors compiled by C. T. Ramage, and Cassell's Classified Quotations, edited by W. Gurney Benham. Bartlett's Familiar Quotations and Stokes' Cyclopaedia of Familiar Quotations are also useful works of this class. The term quotation is also used in business circles for the actual price at which an article can be obtained. Day by day the

published in the papers, while dealers in other commodities have various methods of making their prices public.

Quotidian Fever. Form of intermittent fever in which there are recurring paroxysms every day (Lat. *quotidie*).

Quo Vadis (Lat., Whither goest Thou?). Title of a novel by the Polish writer Henryk Sienkiewicz (*q.v.*). It deals with the persecutions of the early Christians in Rome under Nero, and, published in 1895, was first translated into English in 1896. It has also been translated into all the principal languages of the world. A dramatized version was produced at the Adelphi Theatre, London, in 1900, and an elaborate cinematograph film of the story was made in Italy in 1912.

Quo Warranto (Lat., by what warrant?). Writ of inquiry instituted in England by Edward I in 1278. The king had been seriously injured by encroachments on his royal privileges from time to time, and so he appointed commissions to examine the warrants by which the various barons and corporations owned land and exercised jurisdiction. Consequently, if the title was found defective the land could be recovered for the crown. It was when interrogated under one of them that Earl Warrenne threw down an old sword, telling the king's men that by that sword his ancestors had won his lands, and by the same sword he would keep them. In modern times information in the nature of a quo warranto is a civil process, with special reference to municipal offices, though it has been replaced in certain cases by an election petition under the Municipal Corporations Act, 1882.

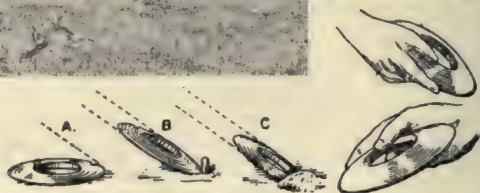
Q.V. Abbrev. for the Latin *quod vide*, meaning which see.



Quoits. A game of quoits on an Essex village green. The diagrams show, A, a ringed quoit; B, a cutter; C, a quoit pitched true; and how the quoit should be held

the number of directors necessary to form a quorum, and in other cases it is laid down by rules or

quotations on the various Stock Exchanges are





R. Eighteenth letter of the English and Latin alphabets, one of the two liquid consonants, *l* being the other. Its normal sound is that in *rat*, *road*, and softer in *lard*. It is almost inaudible at the end of words, unless a vowel follows; in a *good mother* the *r* is almost inaudible, but in the *mother of three* it is distinctly heard. In words like *centre* the position of *r* and *e* is reversed as in *-le*, *centre* being pronounced, and in the U.S.A. generally written, *center*. *R* exercises a distinct influence on the sound of the vowels; for instance, it changes short *a* into the long Italian *a*, e.g. *can*, *car*, and short *o* into broad *o* or *au*, as in *not*, *nor*. *R* is mute in *worsted* (*yarn*), but is audible in *worsted* (defeated). See Alphabet; Phonetics.

R. Name given to a type of British rigid airship, constructed 1914-21. They are distinguished by the letter *R* followed by a number. The best known were R31, R32, R33, R34, R36, R38, and R80.

R33 and R34 were sister ships. The former made notable voyages, and was used to control traffic by wireless on Derby day of 1921. The latter became famous by its flight to America and back in 1919. (See Atlantic Flight.) Built by the Clyde engineering firm of W. Beardmore & Co. Ltd., and launched in 1919, R34 had a gas capacity of nearly 2,000,000 cub. ft., was 643 ft. long, and over 90 ft. from top to bottom. Her total weight fully loaded was 59.2 tons, of which 30 tons was available for crew, fuel, and

passengers. Fitted with five Sunbeam aero engines of 250 h.p. each, she was capable of a maximum speed in still air of 62 m. per hour.

There were four cars suspended from beneath the hull. In Jan., 1921, the airship met with disaster, colliding with a hill in Yorkshire. She managed to reach the Howden aerodrome, but later became a total wreck. (See The Log of H.M.A. R34, E. M. Maitland, 1921.)

R36 is a rigid commercial airship and was built at Beardmore's aerodrome, Inchinnan, making her trial flight in April, 1921. She is slightly longer than R34 and has a huge central gondola, with accommodation for 50 passengers, and cost £350,000. She was slightly damaged at Pulham in June. R37 was being constructed in July, 1921. R38, the largest airship in the world, was built at Cardington, Bedford, for the American navy. Its gas-containing capacity was about 2,700,000 ft.; length, 695 ft.; diameter, 85 ft. 4 ins.; engines, 6 Sunbeam Cossack of 350 h.p. On Aug. 24, 1921, she was wrecked while flying over the

Humber, only five out of her company of 49 being saved.

R80 was built at Barrow by Messrs. Vickers, launched in July, 1920, and put back for alterations, making her trials in Feb., 1921. She is 530 ft. long, 70 ft. in diameter, with a gross gas capacity of 1,250,000 cu. ft. She can make 65 m. per hour for 4,000 m., and has a cruising speed of 50 m. per hour for about 6,500 m. See N.V.

R.A. Abbrev. for Royal Academy or Academician; Royal Artillery; Rear-Admiral.

Ra or **Rē**. Egyptian Sun-god. Represented as a solar disk traversing the sky in a bark, incense was offered to him at dawn, noon, and sunset. At Heliopolis his principal temple was erected in the XIIth dynasty. Assimilated to Horus of Edfu, he became hawk-headed, with sun-disk and uraeus (serpent head-dress). From the Vth dynasty every king bore a Ra-name. See Amen-Ra; Egypt.

Raab. River, city, and co. of Hungary, the Magyar name being Győr.

The river, also called the Rába, rises in the E. Alps in Austria and flows in a curved course through Hungary to join the Little Danube at the town; its length is 160 m. The co. lies S. of the Danube in the Upper Hungarian Plain, and comprises the lower valley of the river. Its area is 580 sq. m. The city, formerly a royal Hungarian free city, is 67 m. W.N.W. of Budapest; it occupies the site of the Roman Arrabona. The chief edifices are the handsome town hall, the 15th



Raab, Hungary. The Town Hall

century bishop's palace, and the cathedral, rebuilt 1639-45. Pop., co., 92,000; town, 43,000.

Raabe, WILHELM (1831-1910). German novelist. Born at Eschershausen, Sept. 8, 1831, he made a success in 1857 with *Die Chronik der Sperlingsgasse*, which, as did all his works, appeared under the nom de plume of Jakob Corvinus. His characters were largely drawn from the country folk of Brunswick, and were delineated with pathos and humour. His principal novels were *Der Hungerpastor*, 1864; *Abu Telfan*, 1868; *Prinzessen Fisch*, 1883; *Hastenbeck*, 1899; and *Altershausen*, 1911. A collection of his stories appeared in 1901 and 1912. He died at Brunswick, Nov. 15, 1910. See *Works*, 4 vols., 1896-1900; *Lives*, P. Gerber, 1897; W. Brandes, 1901.

Raasay. Island of the Inner Hebrides, Inverness-shire, Scotland. It is separated from the Isle of Skye by the Sound of Raasay. The surface is generally hilly in the S. and barren towards the N. On the E. coast are the ruins of Brochel Castle, an ancient fortalice. Its length is 12 m.; breadth from 1 to 3 m. Pop. 300.

Rabah Zobeir (c. 1846-1900). African chieftain. Of mixed Arab and negro blood, he was born a slave, but in the service of Zobeir pasha he rose to the command of the latter's slave-raiding forces in Bahr-el-Ghazal. Defeated by the khedive, 1879, he fled to Central Africa, where, for some years, his slave raids and depredations troubled both British and French. Seizing 300 rifles from the baggage of a murdered French explorer, Paul Crampel, in 1893 he deposed the sultan of Bornu (Lake Chad), and in 1897 attacked the sultan of Bagirmi, driving him and the French resident from the country. A French punitive expedition was dispatched in 1899, and, after three severe battles, routed his forces and slew Rabah, April 22, 1900. See *La Chute de l'Empire de Rabah*, E. Gentil, 1902.

Rab and His Friends. Short story by Dr. John Brown (*q.v.*). Published in 1859, it was later included in his *Horae Subsecivae*: Second Series. Rab is an old mastiff belonging to a Scottish carrier, and the tender moving story in which he is a chief figure is of the death of Ailie, the carrier's wife, after an operation. It is a little masterpiece of simple pathos.

Rabat. Port in Morocco. It stands on the Atlantic coast at the mouth of the river Ragreb, opposite Sallee or Sali, and was once the chief port for European commerce. It is connected by a light

ry. with Fez (*q.v.*) and Casablanca (*q.v.*). Olive oil, wool, skins, bones, and wheat are exported; carpets and textiles are manufactured. Pop. 30,000.

Rabba. Town of Northern Nigeria. On the left bank of the Niger, it is about 200 m. above the confluence of the Niger and Benue rivers, and a few m. below Jebba. When visited by Richard Lander in 1830, it was a place of importance as a commercial and slave market with 40,000 inhabitants, but it has now only a small population.

Rabbah OR **RABBATH**. Chief city of the Ammonites (*q.v.*). Situated in the mts. of Gilead and identified with the modern Amman, it was here that Uriah the Hittite, set in the forefront of battle during the siege of the place, lost his life. At Rabbah Conder found a huge stone throne which he thought to be the "bedstead" of Og, king of Bashan. The city is the subject of denunciation in several O.T. prophecies (Deut. iii, 11; 2 Sam. xi, 17; Jer. xlix, 1-3; Ezek. xxi, 20, xxv, 5).

Rabbet OR **REBATE**. In carpentry, a right-angled groove made at the edge of, or in, a plank to receive a corresponding piece of wood, thus forming a joint. See *Joinery*; *Plane*.

Rabbeth, SAMUEL (1857-84). British medical man. The son of J. E. Rabbeth, a banker, he was educated at King's College, London, and took his medical degrees at London University. In 1884, when serving at the Royal Free Hospital, London, to save the life of a child suffering from diphtheria he sucked the throat, and, taking the infection, died Oct. 20, 1884. This heroism is commemorated by cots at the hospitals, by a scholarship at King's College, and in other ways.

Rabbi (Hebrew, my master). Jewish title for a teacher (Matt. xxiii, 7). The term is now commonly applied to the Jewish clergy. Christ

was addressed as Rabbi (John 1, 3, and 6). Among Jewish scholars Judah, the editor of the Mishnah, is known as the rabbi. See *Jews*.

Rabbit (*Oryctolagus cuniculus*). Animal belonging to the order Rodentia, or gnawing mam-

mals. With the hare it is distinguished from the rest of the rodents by the presence of an additional pair of incisor teeth in the upper jaw.

The rabbit is distinguished from the hare (*Lepus*) by its smaller size, shorter ears, legs, and feet, and grey colour. There are also differences in the relative length of the bones of the legs and in the habits of the two animals. Whereas hares are solitary, and crouch in furrows or in hollows under herbage, rabbits are gregarious and live in burrows. They are also much less fleet of foot.

The origin of the rabbit has been the subject of much debate, and is still very obscure. Its remains do not occur in prehistoric encampments, and the fact that its bones have been found in cave deposits with those of extinct animals proves nothing, as the burrowing habits of the animal may account for it. There is no record of its introduction to the British Isles. It has been assumed, but without any proof, that it was brought by the Romans. At any rate, it was common in England in the 12th century, but in the Highlands of Scotland it was almost unknown a hundred years ago.

The rabbit is a nocturnal animal, feeding in the late evening and early morning; but in quiet spots it may be seen about at all hours of the day. Owing to its large numbers, it is a most destructive creature in plantations and gardens. Its fur is made into cheap imitations of better kinds, and is felted for the production of hats.

As the rabbit often has four or five litters in the year, and the young ones are ready to breed at six months old, it multiplies at a prodigious rate if not kept down. It has been calculated that a single pair under favourable circumstances could have a progeny of over thirteen millions in three years. In Australia the introduction of this rodent has resulted in a most serious menace to agriculture.

The rabbit is largely kept in captivity, as a pet and for commercial purposes, and its domestication has brought about many changes in size, colour, and form. One of the most curious is a modification of the skull, which causes the ears to droop instead of standing erect. The large "double-lop" is a favourite breed with the fancier.

The so-called Belgian hare, which is really a modified rabbit, attains a large size, and is imported in large numbers to this country for consumption as food. The Angora is known by its long



Rabbi in ecclesiastical robes

woolly fur, and the so-called Himalayan is merely a colour variety produced by crossing a silver-grey and a chinchilla. The Dutch fancy rabbit is noted for its small size.

RABBIT FARMING. The flesh and pelt of the rabbit are both of value, and the considerable demand in Great Britain is largely met by importation, chiefly from Australasia. There is ample scope at home for controlled production of rabbits, either in properly managed warrens or on rabbit farms. In warrens most of the animals must be killed off before the end of the year, re-stocking in January or February; this enables the ground to get clean. Tame rabbits should not be introduced into the warren. Hay is used in racks for winter feeding, and can be supplemented by a small amount of maize. Turnips should be avoided.

RABBIT SHOOTING. Under the Ground Game Act the tenant farmer may shoot rabbits on his farm, although the sporting rights are reserved to the landlord. The two modes of shooting rabbits are by a special battue, or taking them as a chance variety of ground game when out pheasant and partridge shooting. Beating for rabbits in covers should be accomplished by the beaters poking them out: a rabbit will run from the least prod with a stick, but if struck may be beaten to death before it will run. It is practically impossible to drive them up-wind to guns, their sense of smell being so remarkably keen. In getting rabbits out into the open for shooting, the openings of their burrows should be plentifully besprinkled with gas-tar daily for three or four days previous to the shoot, when, owing to their dislike of the smell of the gas-tar, they will vacate their burrows and lie out in the adjacent fields. Another method widely used is to employ ferrets to drive the rabbits from their burrows.

Rabelais, FRANÇOIS (c. 1490–c. 1553). French author. Born at Chinon in Touraine, where his father was an apothecary, he was educated for the Church, and about 1509 entered the Franciscan monastery of Fontenay-le-Comte in Poitou. But here his enthusiasm for humanistic studies aroused the hostility of his superiors, and in 1524 he obtained permission to transfer himself to the less austere order of Benedictines, in which he remained till 1530, when he abjured the ascetic life altogether.

Inspired by his passion for science, he then took up the study of medi-



Rabbit. Types of familiar breeds. 1. Silver. 2. Lop-eared. 3. Common wild rabbit. 4. White. 5. Giant

cine, received his doctor's degree at Montpellier in 1537, lectured, edited a number of medical works, and practised in the hospitals at Lyons. In the meantime Rabelais had been twice in Italy, in 1534 and 1536, in the suite of Cardinal du Bellay, with whom he again went to Rome in 1549. In 1546–47 he was town physician at Metz, and from 1550–52 curé of Meudon. He removed to Paris in 1553 and died there, it is supposed, shortly after his arrival.

Rabelais' one great work in literature, produced at intervals amid his other avocations, is a series of chronicles narrating the adventures of two mythical giants—*La Vie très horrible du grand Gargantua*, forming Book I, and *Pantagruel*, *Roy des Dipsodes*,



François Rabelais, one of the world's great satirists

From a painting in the Louvre



avec ses Faicts et Prouesses Espouvantables, Books II–V; though the authenticity of Book V, which was not published till twelve years after his death, is uncertain. Superficially viewed, these chronicles are nothing but an immense, rambling burlesque: *roman d'aventures*, in which the author's amazing humour runs riot amidst the wildest extravagances and the grossest indecencies. But Rabelais was not only a great humorist; he was also one of the boldest and most progressive thinkers of his time; and he deliberately adopted his farcical machinery as the vehicle of his opinions on many subjects which it was then dangerous to discuss in earnest. Even so, the theologians came to perceive the revolutionary potency of his teaching, with the result that his fourth book was condemned by the Sorbonne and prohibited by the Parlement of Paris.

Modern criticism is probably inclined to read too much system into his philosophy; but its main drift is clear. It rests ultimately upon the heretical belief in the absolute goodness of nature and what is natural, and as this belief involved the principle of freedom for life and thought, it brought him into collision with both the old and the new school of theology. But though he did not spare the Calvinists, his fiercest satire is directed against medieval Catholicism, and especially against its dogmatic tyranny, the intellectual

submissiveness inculcated by it, and its asceticism. Rabelais' work was translated into English by Sir Thomas Urquhart and Pierre Motteux, 1653-94. Sir Thomas Urquhart translated books i and ii in 1653; book iii appeared in 1693, and books iv-v, by Pierre Motteux, in 1694. This joint version has been often reprinted, notably in the Tudor Translations, 3 vols., 1900. A modern translation, by W. F. Smith, 2 vols., 1893, contains minor writings, letters, and other documents of interest. In connexion with the 7th centenary of the university of Montpellier, Nov., 1921, M. Millerand, the French president, unveiled, in the garden planted by Henri Quatre, a monument to Rabelais, consisting of a bust and medallions representing Pantagruel, Gargantua, Panurge, and Jean des Entonneurs. *Pron.* Rahblay.

W. H. Hudson

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Rabies (Lat. *rabere*, to rave). Disease due to infection by a micro-organism usually conveyed by the bite of a dog. From time to time muzzling orders have been enforced in England owing to the prevalence of rabies, as in 1919-21. *See* Dog; Hydrophobia; Muzzling Order.

Raby Castle. Seat of Lord Barnard. It is in Durham, 5 m. from Barnard Castle, overlooking the Tees. The original castle was built by a Neville before 1400, but most of the present building is of somewhat later date. One of the finest specimens of a feudal castle in England, it is surrounded by ramparts and a moat, and has a keep, a machicolated gateway, and some massive towers. The baron's hall is the chief feature of its magnificent interior. In the 17th century it was bought by Sir Henry Vane; it was later the chief seat of his descendants, the dukes of Cleveland, passing to another Vane, Lord Barnard, on the extinction of the dukedom in 1891.

Racahout (Fr.). Farina from the edible acorn of the Barbary oak. It is flavoured, and used in much the same manner as arrowroot. Nutritious imitations are made with chocolate, sugar, tapioca and potato flour, and vanilla.

Racalmuto. Town of Sicily, in the prov. of Girgenti. It is situated in a hilly district, 13 m. by rly. N.E. of Girgenti, and trades in wine and olive oil. There are mines of quicksilver, sulphur, and salt in the vicinity. Pop. 16,000.

Raconigi. Town of Italy, in the prov. of Cuneo. It stands on the river Maira, in a fertile plain, 23 m. by rly. S. of Turin. The royal château, built in 1570, but since considerably enlarged and restored, has a fine park laid out in French style. The chief manufactures are connected with silk and woollen goods, and there is trade in local produce. Pop. 11,000.

Race. Term denoting in its widest sense any group of organic beings related through descent from a common ancestor. The specific unity of mankind is implied in the phrase "the human race." The primary races are those major divisions of mankind which acquired in a remote past certain distinctive characters, physical and mental, transmitted by inheritance and by that alone. Race accordingly denotes breed; hence language, religion, and other incidents of the social environment can never be a test of race. It is as inaccurate to call the Aryan-speaking peoples the Aryan race as it would be to call the followers of Islam the Moslem race. So also, while there is socially an English people, and politically an English nation, there is anthropologically no English race.

Racial characters include the form of the head and its organs, skin-colour, stature, and other data. They all tend to vary, because there are plastic elements in every human body, but so far as they persist they constitute race. For purposes of classification the most useful character, because the least variable, is the hair. This occurs in three main forms; oval in section and wavy or curly, round in section and lank or straight, riband-like in

section and woolly or frizzly. These characters are associated respectively with three types of skin-colour, white, yellow, and black. While, therefore, the colour of the world's peoples varies within wide limits, a rough division into white, yellow, and black races is of practical service.

Between this minimum classification and that of J. Deniker, who divided mankind into 30 races, many intermediate schemes have been propounded. Sir H. H. Johnston, in his article on Ethnology, in this Encyclopedia, adopts a fourth class, the Australoid; Keane separates the American or red race from the Mongolian division; while Blumenbach took another section from the Mongolian to form a fifth division, the Malay. But both the Amerind and the Malay types originated long after the central Asian Mongolian developed its main characters, and are therefore secondary rather than primary.

The Caucasian or white race prevails in the temperate regions of the Old World except in N. and E. Asia, and also in tropical Arabia, India, Indonesia, and Polynesia. It now dominates also the New World. Its main types are the Mediterranean, Nordic, and Alpine, with remnants of primeval forms such as the Ainu and Toda.

The Mongolian embraces two sub-races, yellow and red. The yellow sub-race presents three well-marked types: northern, including the Altaian, which has overflowed into E. Europe as far as Lapland, preceded in time by the palaeasiatics and Eskimo; southern, prevalent in Tibet, China, and Indo-China; and oceanic, including Malaysia and Madagascar. The red sub-race embraces all aboriginal America south of the Eskimo region.

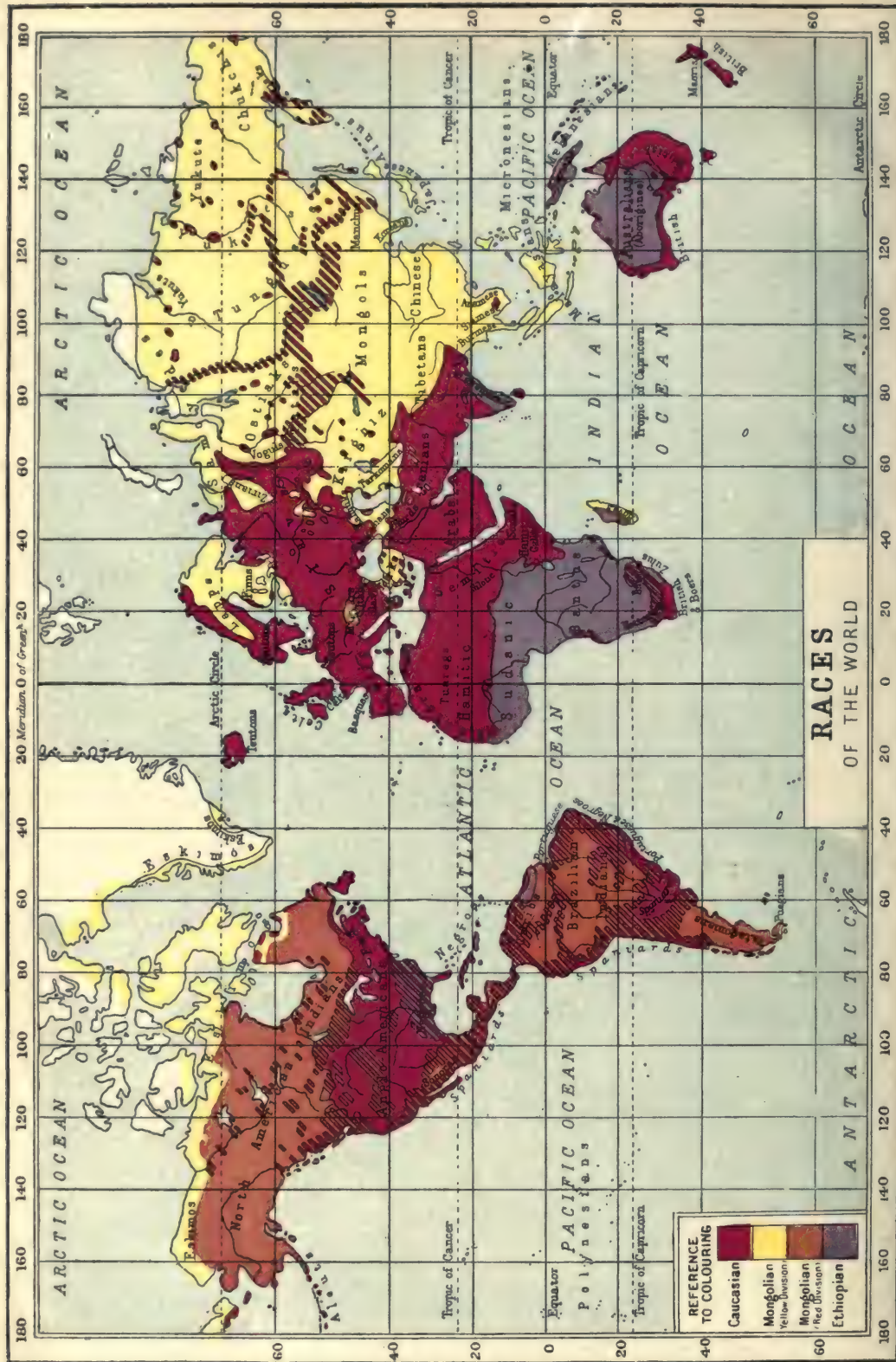
The Ethiopian or black race mainly prevails in Africa, S. of the Sahara on the W., S. of the Victoria Nyanza on the E. It embraces the

true negroes of W. Africa and the Sudan, as well as the Bantu-speaking peoples, with Hamitic and therefore Caucasian admixture. A considerable offshoot has been planted in the southern United States, West Indies, Guiana, and Brazil. An oceanic or eastern section, which is now numerically of little or no importance,



Raby Castle, Durham. South front of the feudal castle, from the park

By courtesy of Country Life, Ltd.



inhabits New Guinea and Melanesia, and includes pygmy negro peoples in the Philippines, Malaysia, and the Andamans. The Australian aborigines and the pre-Dravidians of S. India—Johnston's Australoids—are curly or wavy-haired, and therefore of remote Caucasian kin, although commonly ranked with the black race on cultural grounds. (See *Ethnology*; also *Race*, col. plate.)

The word race is also used for a competition of any kind. See *Athletics*; *Horse-racing*; *Running*.

Racecourse. Ground on which horse races are held. There are three kinds of racecourse, the hurdle-race, the steeplechase, and the flat-race course. The flat-race course, as the name implies, is for races without obstacles. The hurdle-race course must have at least six hurdles, not less than 3 ft. 6 ins. high, in the first mile and a half, and at least one for each additional $\frac{1}{2}$ m. The steeplechase course must have (a) at least 12 fences, excluding hurdles, in the first 2 m., and at least six more in each additional m.; (b) at least one ditch, not less than 6 ft. wide and 2 ft. deep; and (c) a water jump not less than 12 ft. wide and 2 ft. deep. The distance of flat races varies from 5 furlongs to $2\frac{1}{2}$ m., and of hurdle races and steeplechases from 2 m. to a little more than 4 m., except for hurdle races for three-year-olds, which from Sept. 1 to Dec. 31 inclusive may be run over a minimum distance of $1\frac{1}{2}$ m.

Among the principal racecourses in the United Kingdom are those at Epsom, where the Derby Stakes is run, Ascot, Goodwood, Newmarket, Doncaster, Manchester, York, Liverpool (Aintree), Kempton Park, Sandown Park, Hurst Park, the Curragh, Ayr, and Edinburgh. Aintree is the scene of the Grand National, the most important steeplechase event. Newmarket is the English racing headquarters, the Curragh holding a similar position in Ireland. In England there are 40 courses licensed by the Jockey Club, and about the same number are licensed by the National Hunt Committee. Southend-on-Sea, Bournemouth, and Lowestoft are the sites for proposed new courses. See *Derby*; *Horse-racing*; *Leopardstown*; *Long-champs*; *Newmarket*, etc.

Raceme (Lat. *racemus*, a cluster of grapes). Botanical term for that form of flower grouping (inflorescence) in which the separate flowers are arranged on short lateral stalks from a central axis. Familiar examples may be found in the bluebell and the barberry. The raceme is a type of what is known as the

monopodial inflorescence, in which the main shoot continues to lengthen, whilst giving off side branches in succession, each of the latter terminating in a flower. See *Flower*; *Inflorescence*.

Racemic Acid. Organic acid discovered by Kestner in 1822, as a by-product in the manufacture of tartaric acid, with which it is isomeric. Racemic acid can be produced by heating tartaric acid with water for thirty hours, at a temperature of 175° C. It is a crystalline body, less soluble in water than tartaric acid.

Race Suicide. Term that came into use in the 19th century to indicate the decrease of the population of a country, due to the excess of deaths over births. If this continues long enough, it must result in the extinction of the nation in question, and when it arises from deliberate action, it is fitly referred to as suicide. See *Birth Rate*; *Eugenics*; *Population*.

Rachel. In the O.T., younger daughter of Laban, sister of Leah, favourite wife of Jacob, and mother of Joseph and Benjamin. With Leah, she took Jacob's part in his quarrel with Laban. She died in giving birth to Benjamin. The Jewish captives of Nebuchadnezzar passed her tomb on their way to exile (Gen. 29, 31, 35; 1 Sam. 10; Jer. 31; Matt. 2). Over the traditional tomb of Rachel Moses Montefiore erected a small hut in 1849, and in 1867 Rabbi Zwi Kalischer bought a tract of the surrounding land, which his son presented to the Jewish community at Jerusalem. A dispute as to the ownership of the tomb arising in Sept., 1921, was referred to the Commission on Holy Places, the Jews, meanwhile, being permitted to carry out necessary repairs, but without prejudice to any rights claimed by the Moslems.

Rachel (1821-58). French actress, whose real name was Elizabeth Félix. Born March 24, 1821, at



Rachel,
French actress
After C. L. Müller

Mumpf, Switzerland, the daughter of poor Jewish pedlars, she sang in the streets as a child, displaying so much talent that Étienne Chorron, the musician, undertook her training till he died in 1833, when she was admitted into the Paris Conservatoire. She made her début at the Théâtre Français, June 12, 1838, as Camille in Cor-

neille's *Horace*, subsequently playing Roxane in Racine's *Bajazet*. On Jan. 21, 1843, she won her greatest triumph as Phèdre, in Racine's tragedy, and in 1849 she created the part of the heroine in Scribe and Legouvé's *Adrienne Lecouvreur*. Rachel created a sensation in London in 1841 and 1842, and won immense applause all over Europe as a tragic actress of supreme genius. She died of consumption at Cannet, Jan. 3, 1858. See *Lives*, J. Janin, 1858; Mrs. A. Kennard, 1885; F. H. Gribble, 1911. *Pron. Rahshel*.

Rachmaninov, SERGEI VASSILIEVITCH (b. 1873). Russian composer and pianist.



S. V. Rachmaninov,
Russian composer

Born at Novgorod, April 2, 1873, he studied at St. Petersburg and Moscow, winning a gold medal for composition, 1892, and appearing as pianist and conductor of his own works in London, 1899. He taught music in Moscow from 1903, worked also in Dresden, visited the U.S.A., 1909-10, and was appointed conductor of the Imperial Opera, St. Petersburg, 1912. His compositions include the operas *Aleko*, 1893, and *Francesca da Rimini*, 1906, orchestral symphonies and piano concertos, chamber music, songs, and piano pieces, the prelude in C-sharp minor (Op. 3) being particularly popular.

Racine. City of Wisconsin, U.S.A., the co. seat of Racine co. It lies at the mouth of Root river, on Lake Michigan, 24 m. S.S.E. of Milwaukee, on the Chicago, Milwaukee and St. Paul, and the Chicago and North-Western rlys. It contains Racine College and Luther College, has a good harbour, and carries on a large trade in manufactured products, which include wagons, carriages, motor vehicles, boots and shoes, agricultural machinery, hardware, and tobacco. Racine was settled in 1834, incorporated in 1843, and became a city in 1848. Pop. 47,500.

Racine, JEAN (1639-99). French dramatist and academician. Early left an orphan, he was brought up by his grandmother, a woman of strong Jansenist leanings, and through her influence was at sixteen admitted to the school of Port-Royal, where he devoted himself with special ardour to the study of Greek literature. Thence he passed to the Collège d'Har-court, on leaving which he gave himself up, to the great distress

of his Jansenist friends, to worldly society and pursuits. He soon attracted attention by some odes, for one of which, on Louis XIV's



Racine

From an engraving by G. Edelinck

marriage, he was rewarded with a hundred livres from the royal purse.

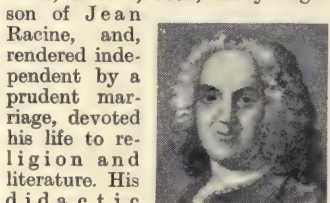
Meanwhile he had become intimate with Boileau, La Fontaine, and Molière, the last named of whom produced his first tragedies, *La Thébaïde*, 1664, and *Alexandre*, 1665. At this time he entered into an acrimonious controversy with the famous Jansenist Nicole, on the subject of the drama, which completed his rupture with Port-Royal. Between 1667 and 1677 he wrote his tragedies *Andromaque*, *Britannicus*, *Bérénice*, *Bajazet*, *Mithridate*, *Iphigénie*, and *Phèdre*, together with a comedy, *Les Plaideurs* (a satire on the law), which was only a qualified success.

By this time he was troubled with growing doubts concerning the stage; and after reconciliation with the Jansenists he abruptly severed his connexion with it. He then married and was appointed, jointly with Boileau, historian to the king. His only remaining plays were two of a religious character written between 1689 and 1691 at the request of Madame de Maintenon for performance by the ladies of St. Cyr—*Esther* and *Athalie*, which rank with his best works. Thereafter he published only four *Cantiques Spirituels* and a history of Port-Royal. He died April 21, 1699, and was buried at Port-Royal.

The French regard Racine as "le classique par excellence," and as one of the chief glories of their literature; and if it is impossible

for English readers to share their enthusiasm, they can at least recognize his pre-eminence within his own chosen and restricted field. Far inferior to Corneille in poetic and dramatic power, he was his superior in art; the severe restraints of the classic form of drama seemed rather to help than to check his genius; and unlike Corneille, whose inequalities are flagrant, he keeps to a uniform level of excellence. With him incident as such has no importance; he uses it only as an initial force in the emotional crisis which is always his central theme; and the interest of his tragedies is purely psychological. While as a result his plays are composed only of endless talk and discussion, his skill as an analyst of passion, and especially of love, is remarkable; while the beauty of his versification deserves the highest praise. See *Racine et Shakespeare*, M. H. Beyle, 1854; *Port-Royal*, vol. vi, 1840; *Nouveaux Lundis*, vols. iii and x, 1863-72, C. A. Sainte-Beuve; *Corneille and Racine*, H. M. Trollope, 1898; *Racine*, G. Larroumet, 1898. *Pron.* Rasecene.

Racine, Louis (1692-1763). French poet. He was born in Paris, Nov. 6, 1692, the younger son of Jean Racine, and, rendered independent by a prudent marriage, devoted his life to religion and literature. His didactic poems, *La Grâce* and *La Religion*, were inspired by his fervent Jansenist faith, and are more remarkable for their piety than for their poetic qualities. His complete works, 6 vols., were published in 1808. He compiled a *Life* of his father which was published in 1747, and translated *Paradise Lost* into French prose. Died Jan. 29, 1763.



Louis Racine,
French poet

Rack. Former instrument of torture. It consisted of an oblong frame of wood on which the victim was stretched and his limbs secured by ropes which could be gradually tightened by pulleys or other devices, till the victim confessed or had his limbs dislocated.

The rack was

known to the Egyptians and Romans. It was extensively used for the torture of Christians to force them to abjure their faith, and in England from the 15th century. At its greatest vogue during the reigns of Henry VIII and Elizabeth, its legality was challenged by the judges in 1628, over the attempted racking of John Felton, the murderer of the duke of Buckingham, and it rapidly fell into disuse. See *Torture*.

Rack-a-Rock. Blasting mixture in cartridge form consisting of potassium chlorate. The cartridges are covered with cotton and then dipped into monitro-benzene so that the cotton absorbs this fluid to the extent of 21 p.c.

Rackets. Ball game popular in England, India, and the British colonies. It is also played to a considerable extent in the U.S.A. Rackets is played on an asphalted court, 60 ft. by 30 ft. in area, enclosed by four walls. The front and side walls are generally about 30 ft., and the back wall 15 ft., in height. A strip of board 26 ins. in height is carried along the bottom of the front wall, forming the playing line, while a painted line, 9 ft. 6 ins. from the floor level, indicates the service line.

On the floor of the court, at a distance of 38 ft. from the front wall, a similar line is painted across the floor from side wall to side wall, called the short line. From the middle of this line extending to the centre of the back wall another line divides the space into two halves, termed the fault line. Just above the short line, in the angles formed by it and the side walls, are two spaces 8 ft. square, designated service boxes. The game is played by two or four players, one against one (singles), two against two (doubles).

The racket consists of a wooden hoop 7 ins. in diameter, strung as tightly as possible with catgut, with a handle about 30 ins. long. The ball is composed of strips of cloth very tightly bound together



Rack. One form of the instrument of torture used in England from the 15th to the 17th century

with twine and covered with white kid, one inch in diameter and one ounce in weight. The server (or hand-in) stands in one of the service boxes, striking the ball on to the front wall above the service line in such a manner as to cause it to drop, either with or without hitting one of the other walls, behind the short line on the opposite side of the court. The opponent (or hand-out) who awaits the ball behind the short line must return it before it touches the floor twice, and the ball must strike the front wall above the board denoting the playing line, in the return. From this point of the game the server's business is to return the ball in a similar manner; this continuing until one or the other makes a fault. The game consists of 15 points or aces.

There are several English championships in connexion with rackets: the open championship (singles) for all classes, established in 1820; and the amateur singles championship, dating from 1888, being the most important. The governing body is the Tennis, Rackets and Fives Association, founded in 1907. *See Fives*; *Pelota*; *Squash Rackets*; consult also *Tennis*, *Lawn Tennis*, *Rackets and Fives*, J. M. Heathcote and others, 4th ed. 1897.

Rackham, ARTHUR (b. 1867). British artist. Born Sept. 19, 1867, he was educated at the City of



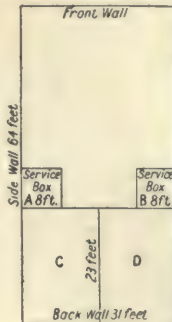
Arthur Rackham,
British artist
Russell

London School. He studied at the Lambeth School of Art, became a member of the R.W.S., and was soon well known as an illustrator of books. One may cite especially his illustrations

to *Peter Pan*, 1906; *Alice in Wonderland*, 1907; and *Wagner's Ring librettos*, published 1910-11.

Racking. In metallurgy, the first or an early stage in the treatment of ores in certain mining districts, Cornwall, for example. The ore is thrown on to an inclined rack of stout iron bars, upon which it is washed with water to remove adherent clayey or other worthless rock. *See Mining*.

Rack Rent. Term applied to a rent which is equal, or nearly equal, to the annual value of the land or tenement. It is commonly used to signify an excessively high or extortionate rental, and the term was frequently associated with certain abuses in land tenure in Ireland. The Towns Improve-



ment (Ireland) Act, 1854, defined rack-rent as "rent which is not less than two-thirds of the full net annual value of the property out of which the rent arises." *See Rent*.

Racoon. Small carnivorous mammal, related to the bears. Racoons are confined to America, and include two or perhaps three species. The common racoon (*Procyon lotor*) is about 24 ins. long in body, with a tail about 10 ins. in length. It is a stoutly built and heavy animal, covered with thick, greyish-brown fur, the tail being ringed with black; but it varies much in size and colour.

It occurs in N. America, but is rarely seen by day. It makes its home in holes high up in the trees, only coming down at night in search of food; it feeds upon small birds and mammals, fish and freshwater mussels, and occasionally varies its diet with young corn and fruit. In the colder districts it hibernates during the winter, but remains active in the more S. regions. Its fur is valued in the trade, and it is vigorously hunted and trapped, with the result that it is no longer numerous in many districts. In S. America the crab-eating racoon occurs. *See Coati*.



Racoon. Common variety of the nocturnal animal of North America



Rackets. Top, left, plan of court. 1. Players in position, player on left waiting to receive ball served by the other player. 2. Backhand service. 3. Forehand stroke

Radautz. Town of the Bukovina, Rumania. Situated 32 m. S. of Czernowitz, it has manufactures of machinery, paper, and leather, and is noted for horse-breeding. Pop. 14,000.

Radbertus. Medieval theologian. Born about 800, he became a monk at Corbie, in N. France, and there he passed his life in teaching and study. He was for a few years abbot of the house, and he died about 860. Radbertus made a reputation as a theologian by his work on the *Body and Blood of Our*

Lord, one of the earliest works on the subject of transubstantiation.

Radcliffe. Urban dist. and market town of Lancashire, England. It stands on the Irwell, 8 m. from Manchester, with a station on the L. & Y. Rly. The buildings include the old church of S. Bartholomew, restored in the 19th century, and the modern

market hall. The industries include the making of cotton, paper, and chemicals: dyeing and bleaching; iron-founding and coal-mining. Market day, Fri. Pop. 25,000.

Radcliffe, ANN (1764-1823). British novelist. Born in London, July 9, 1764, the daughter of William Ward, in 1787 she married William Radcliffe, afterwards proprietor of *The English Chronicle*. She wrote several novels, in which the influence of certain aspects of the prevailing romantic movement is very marked. Her fame rests chiefly on *The Mysteries of Udolpho*, 1794, which enjoyed great contemporary vogue; *The Italian*, or the Confessional of the Black Penitents, 1797, was received with equal enthusiasm. She died Feb. 7, 1823. In handling the mysterious and supernatural in such a way as to keep the reader's attention at fever pitch until the dénouement, when the supernatural is explained away, Ann Radcliffe has scarcely a superior. She also excels in the description of scenery, but her characterisation is weak.

Radcliffe, JOHN (1650-1714). English physician. Born at Wakefield, he was educated at University College, Oxford, taking a degree in medicine. In Oxford and then in London he made a reputation as a physician, and became medi-



Johannes Radcliffe
After Kneller

cal attendant to William, Mary, and Anne. He was a member of parliament, and died at Carshalton, Nov. 1, 1714. Radcliffe is known as a benefactor to Oxford, as with money bequeathed by him were built the library, observatory, and infirmary that bear his name, which is also perpetuated by travelling fellowships for students of medicine.

Radcliffe Observatory. Astronomical observatory in Oxford. It was founded in 1771 with funds provided under the bequest of John Radcliffe, and built between 1772-95. Its observations were first published in 1839, and star catalogues have been compiled. It



Radcliffe, Lancashire. Parish church of S. Bartholomew

has also meteorological apparatus. See *Heliometer*; *Observatory*.

Radeberg. Town of Saxony, Germany. It stands on the Röder and the Dresden-Görlitz rly., 10 m. N.E. of Dresden. Its castle was built 1543-46. It manufactures glass, gloves, ribbons, etc., and there are breweries. In the vicinity are the famous chalybeate springs of Augustusbad and Hermannsbad. Pop. 13,000.

Radegunde. Frankish saint and queen. The daughter of a German prince, she married the Frankish king, Clotaire, about 530. By her piety she won considerable renown. In consequence of a feud between her husband and her kinsfolk, she left Clotaire and became a nun, founding a religious house at Poitiers. She died Aug. 13, 587.

Radek, KARL. Bolshevik leader. An Austrian Jew, his name was originally Sobelsohn. He was one of the early teachers of Bolshevism, and during the Great War spent much time in Switzerland disseminating articles of a socialist nature. In 1918 he was director of Russian Bolshevik propaganda, and went



Karl Radek,
Bolshevik leader

to Berlin, where he tried to instigate a Spartacist alliance with Russia against the Entente. Later he became assistant-commissary for foreign affairs at Moscow. See *Bolshevism*.

Radetzky, JOHANN JOSEF, COUNT (1766-1858). Austrian soldier. Born in Bohemia, he served against



Count Radetzky,
Austrian soldier

the Turks in 1788-89, and in the wars against France. He was commander-in-chief in Lombardy when the revolt broke out there in 1848. Though at first hard pressed, he eventually defeated King Charles Albert of Sardinia at Custoza, and in the following year secured another victory at Novara and besieged and took Venice. He was governor of Lombardy till 1857, and died Jan. 5, 1858.

Radford. District of Nottingham, forming a western suburb of the city. It stands on the Leen and consisted originally of two villages, Old Radford and New Radford. In the 19th century factories and works of various kinds were opened here, and in 1877 the district was absorbed into Nottingham. There is a station on the Midland Rly., and tramways connect Radford with the centre of the city. S. Peter's Church, Old Radford, was rebuilt early in the 19th century. There was a priory here in the Middle Ages. See *Nottingham*.

Radford, ROBERT (b. 1874). British singer. Born at Nottingham, May 13, 1874, he received his musical training at the Royal Academy of Music, winning the Westmoreland scholarship, and becoming a fellow in 1906. Gifted with a sonorous bass voice and commanding presence, he first made a success with his performance in Berlioz's *Faust* at the Norwich festival in 1899. He has sung the principal bass parts in opera at Covent Garden and in the Beecham Operatic companies, distinguished especially in Wagnerian rôles, and since 1907 has sung regularly at the chief provincial musical festivals, and at the Handel festivals, London, 1906-12 and 1920.



Radcliffe Observatory, Oxford. Principal buildings, with the dome, seen on the right, for the large double telescope

Radhanpur. Native state and town of India, in Palanpur agency, Bombay Prov. The state lies between Baroda and the Rann of Cutch, and is drained by intermittent streams, rising in Mt. Abu. The town lies 150 m. N.W. of Baroda and is a centre for minor roads in an unimportant part of the prov. There is some local trade in wheat, grain, cotton, rice, and sugar. Area 1,150 sq. m. Pop., state, 65,600; town, 11,600.

Radial Artery. Artery running from immediately below the bend of the elbow to the outer side of the palm of the hand. Just before crossing over the wrist it can be felt beating beneath the skin, forming there the well-known pulse.

Radial Nerve. One of the terminal branches of the musculospiral nerve (*q.v.*). It is the nerve of sensation to the back of the lower third of the forearm and the back of the thumb, the index and middle fingers, and the outer side of the ring finger.

Radiant. In astronomy, the point in the sky from which the meteors or a meteor shower appear to radiate. This apparent radiation is an effect of perspective, the actual paths of the meteors being nearly parallel. The majority of meteor showers are named from the positions of their radiant points, *e.g.* the Perseids, which have their radiant point in the constellation of Perseus. *See* Meteor.

Radiata. Name given by Cuvier in 1812 to the lowest of his divisions of the animal kingdom. It included a heterogeneous multitude of animals—echinoderms, worms, polyps, and protozoa—which were supposed to have their organization arranged radially instead of bilaterally. Huxley finally broke up what he called "the radiate mob," and the name is not now used in zoology.

Radiation. Name given to energy, emitted by material bodies, which traverses space without the aid of an apparent material medium. According to the electromagnetic theory such energy is dependent on wave motion in the ether.

This theory has been modified during the 20th century by the ideas which have arisen from new conceptions of the atom and of the release of its energies by the dislocations or the recombinations of the electric ions within it; so that, according to views enunciated by Planck and accepted by many modern physicists, radiant energy does not consist of transverse waves in the ether, but of minute pulses of energy, called by Planck quanta. Radiant energy according

to the doctrine would be produced by an increased velocity, an acceleration, of electric charges in the atom. The theory has been experimentally verified in many fields of science.

Radiant energy as commonly understood may be explained from the example of a hot body suspended in air, or any gas. There is loss of heat due to conduction through the gas or convection currents set up in it, and this loss of heat depends on the presence of material particles in the gas. But if the hot body were suspended in a perfect vacuum, it would still shed its heat, or radiate its energy, in all directions, quite independently of the absence of material particles.

It was shown by Newton that a body radiated heat in a steady current of air at a rate proportional to the difference of temperature of the body and the air. In still air the law is more complicated, heated bodies radiating their heat according to the fourth power of the temperature difference. The law is due to Stefan, by whose name it is known, and has been proved experimentally over a large range of temperatures. Another law of radiating bodies is that they radiate most freely those rays which they absorb most freely. Thus glass absorbs the infra red rays, and on heating radiates them to a greater extent than substances which are transparent to the rays.

The radiant heat which reaches the earth from the sun passes through space, which so nearly approaches a vacuum as to be indistinguishable from it; and this space is presumed not to be heated by the radiations of energy passing through it, though the presumption cannot be unhesitatingly accepted. By the analogy of a body suspended in a closed vacuum vessel, the walls of which are of higher or lower temperature than the body, we can arrive at the condition which obtains between a body like the sun, which is always radiating energy, and one which, like the earth, is always receiving it. It is clear that the body in the vacuum will continually radiate energy. *See* Energy; Heat; Light; Radiation.

Radialtor. Apparatus for radiating or dissipating heat. A motor-car radiator consists of a number of metal tubes, through which water used for cooling the engine circulates. The tubes are externally connected by thin webs, or are surrounded by a great number of thin disks, preferably of copper or other good, heat-conducting metal. The radiator is so placed on a car that when the latter is in motion

pressure causes the air to pass through the spaces between the webs or disks and dissipate the heat; at a speed of 20 m. an hour or more through still air the pressure is sufficient for this purpose, but to ensure a constant stream of air at lower speeds, or when the car is stationary and the engine running, a fan is fitted at the rear of the radiator and revolved at high speed by a belt and pulley driven from the engine shaft.

Radiators for heating rooms and buildings consist of frames of tubes, designed to present the greatest possible superficial area to the air, coupled up to piping through which hot water, steam, or hot air is circulated. They are placed on the ground so that, as the air surrounding them is heated, it rises, cooler air takes its place, and a circulation of air is maintained. In electric radiators heat is generated by passing an electric current through resistance coils, which in some cases are enclosed in glass bulbs and give light as well as heat. *See* Heating; Motor Car.

Radical OR **RADICLE** (Lat. *radix*, root). Term applied in chemistry to elements (simple radicals) or groups of elements (compound radicals). It usually denotes a compound radical or group of units capable of passing unaltered from compound to compound. The names of radicals generally end in the syllable -yl, examples being hydroxyl (OH); carbonyl (CO); thionyl (SO); methyl (CH₃); carboxyl (COOH); sulphuryl (SO₂); phosphoryl (PO); nitroxyl (NO). Exceptions to this rule are ammonium (NH₄) and cyanogen (CN). Radicals are either of a positive, basic, or metallic nature, or negative or acidic, and do not mix in a free state.

Radical (Lat. *radix*, root). Term applied to those who desire large changes in the social and political order. In Great Britain the radical party has been an advanced section of the Liberal party; its equivalent in France is the left. The word was first used for politicians towards 1800, and after the French Revolution it became a popular term for those—Orator Hunt being among them—who held advanced opinions. It was also applied to thinkers such as Bentham and James Mill, who tried to introduce a philosophic theory of government based on first principles. They were individualists and economists, but later radicals believed in a constant enlargement of the area of state control. *See* Left; Liberal; Politics; consult also The English Radical, C. B. R. Kent, 1899.

RADIO-ACTIVITY AND THE ATOM

J. M. Nuttall, Assist. Director, Physics Laboratory, Manchester Univ.

*For related information see Atom; Crookes; Curie; Matter;
Radium; Uranium; X-Rays*

The term radio-active is usually understood to apply to those substances such as uranium, radium, thorium, actinium, and their compounds, which have the special property of spontaneously emitting radiations possessing the following characteristics:

1. They will penetrate substances opaque to ordinary light, e.g. they penetrate sheets of metal.

2. They will affect a photographic plate in a dark room.

3. They will produce luminescence and phosphorescence in certain substances placed near them, notably in barium platino-cyanide, and in the minerals zinc-blende and willemite.

4. They have the power of "ionising" any gas through which they pass, that is, render it into a conductor of electricity, and hence these radiations will discharge electrified bodies.

X-rays and Radio-activity

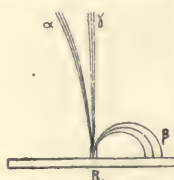
It is important to note that these same properties are also exhibited by other radiations, e.g. by Röntgen or X-rays, but the essential difference between X-rays and radio-active radiations is that the former have to be excited by some external agency, whereas the latter are spontaneously emitted from radio-active substances, and are entirely independent of any external exciting cause. In other words, they are due to the breaking-up or disintegration of the actual atoms of the radio-element. We may regard the latter as being in an unstable state, and continuously disintegrating, giving rise to new atoms which differ entirely in chemical properties from the parent element. It is these continuous explosions of the radio-active atoms that give rise to the characteristic radiations. This instability is only found in the heaviest known elements—the radio-elements are all heavier than lead.

Historically the impetus for the discovery of radio-activity was provided by the discovery of X-rays in 1895, by Röntgen. In the following year Becquerel examined a number of phosphorescent and fluorescent substances, to see if they emitted photographically active rays, and found that salts of uranium were effective, independent of previous exposure to light. Later, other substances were found to give off rays similar to those from uranium.

Special methods of measurements were devised for studying

the radio-activity of these elements, the most useful being based on the ionising property of the rays. The "ionisation current," through a layer of gas exposed to the rays, can be measured by the rate at which it discharges a gold-leaf electroscope, and this gives a comparative measure of the activity of the substance used.

The next advance made was the discovery of the nature and classification of the types of rays given off by radio-active elements. Experimentally it is observed that their penetrating powers are widely different; some, for instance, are stopped by a sheet of paper, others will pass through a few inches of lead. Secondly, it is found that some of the rays are bent by a magnetic or an electric field, proving them to consist of minute electrically charged particles moving



Radio-activity. Diagram illustrating effect of magnetic field in separating radiations. See text

while the amount of the deviation gives an estimate of the speed and mass of the particles. Using these methods of measurement, Rutherford showed conclusively that the radiations from radio-active substances were of three distinct types, which he called the alpha, beta, and gamma rays (α , β , γ).

Nature of X-rays

The α rays are positively charged particles, each of mass four times that of the hydrogen atom. They are emitted at high speeds, about the order of 10,000 miles a second, but are very easily stopped, e.g. a sheet of ordinary writing paper will stop the swiftest known α rays. They travel up to about 3½ inches in air at ordinary pressures, but they ionise the air very intensely indeed in their short range. They will also produce very strong photographic and phosphorescent effects. Finally they have definitely been proved to be electrically charged atoms of helium.

The β rays are also corpuscular in nature, and consist of very high speed, negatively-charged particles of small mass (about two thousand

times less than mass of the hydrogen atom). That is to say, β rays are electrons moving with high velocity. Their range is from 10 to 20 times greater than that of the α rays, and they can pass quite easily through thin sheets of aluminium. The fastest known β rays are emitted with velocity approaching that of light. The ionising power of the β rays, however, is only small—about 100 times less than that of the α rays.

The mass of the β rays being so exceedingly small, although their average velocity is great, their momentum is small, and hence they are easily deflected or bent by magnetic or electric fields, the direction of the deflection being opposite to that of the α rays. In character the β rays are identical with the "cathode rays" produced when an electric discharge passes through a rarefied gas.

Electro-magnetic γ rays

The γ rays are not corpuscular in nature, but consist of electro-magnetic impulses of very short wave-lengths. Hence in character they are analogous to X-rays. The γ rays, bearing no electric charges of any kind, are therefore not deflected in magnetic or electric fields, and are far more penetrating than the α or β rays—they will pass through several inches of aluminium. The ionising power of these rays is still smaller than the β rays, and about 1,000 times less than that of the α rays, and their photographic and phosphorescent actions are correspondingly small.

The effect of a magnetic field in separating out the radiations is shown in the figure. A beam of the rays emitted by a small amount of radium at R is subjected to a magnetic field at right angles to the plane of the paper, and directed downwards. The β rays are bent to the right, showing them to be negatively charged particles, and the amount of the deflection is large, proving them to be of small mass. The α rays are bent to the left, and are therefore positively charged particles, whilst the extent of the deflection is very small (compared with the β rays), showing them to be of relatively large mass. In the diagram, the bending of the α rays is greatly exaggerated. Lastly, the γ rays go straight on without any deflection, proving them to be electrically uncharged.

In order to account for the phenomena of radio-activity, Rutherford and Soddy put forward the transformation theory, according to which the atoms of a radio-element are undergoing a process of spontaneous disintegration, that is continually breaking up, with

the production of new atoms possessing different, yet distinct chemical properties. The radiations given off are parts of the disintegrating atom (hence the conservation of matter is preserved), and they provide a measure of the rate of breaking up of the atoms. The new atoms formed may be unstable and break up in their turn, giving off a characteristic type of rays, and this transformation process continues through a number of stages. No element of atomic weight less than that of lead has been found to be radio-active.

Only about one atom of radium in about 100,000,000,000 (one hundred thousand million) breaks up every second, or about half the atoms in 1,800 years, and each disintegrating atom expels an α particle. The residual atom is called radium emanation—a heavy gas, much more unstable than radium, and transforming with the expulsion of an α particle to half-value in about four days. A number of succeeding transition products are derived from the radium emanation, denoted by the names radium A, radium B, radium C, to radium F, the transformation of each member of the family being accompanied by the emission of either an α or β particles, or both. Each of these transition products is to be regarded as a new element, although some have only an average life of a few minutes.

The continuous production of fresh radio-active matter by a radio-element, and the continual decay of the matter so formed, according to a definite law, explains quite satisfactorily all the known facts of radio-activity. It is important to emphasise that these changes go on quite spontaneously, and cannot be controlled by outside agencies in any way—they proceed at the same rate, at temperatures varying from that of liquid air ($-186^{\circ}\text{C}.$) to that of an electric furnace ($2,000^{\circ}\text{C}.$).

All known radio-active substances can be conveniently divided into three families, the parent elements of which are uranium, actinium, and thorium; radium itself belongs to the uranium series.

Radio-activity has brought us very much nearer to the conception of the nature of the atom. It has introduced us to an electrically charged atom of helium (the α ray), which appeals to our physical sense, inasmuch as it can be detected individually, either by its action on a fluorescent screen, as in the "spinthariscopes," where each atom (α particle) striking the screen produces a visible pin-point of light ("scintillations"), or by its electrical effect by the movement

of a delicate electrometer. See Radio-active Substances and their Radiations, Sir E. Rutherford, 1913; Radio-activity and Radio-active Substances, Chadwick, 1921.

Radiograph. Name given to a photograph made by means of X-rays. It was found by Lenard in 1894 that the rays from a Crookes tube affected a photographic plate very much as light affected it, and in 1896 Röntgen obtained a radiograph of the hand, showing that flesh was almost transparent and bones by contrast opaque to the rays. The lodgement of foreign substances in the body, the fracture and diseases of bones, and even digestive processes by suitable diet, may be observed by means of radiographs. The use of the method has been extended to the study of the internal structure of many substances, for taking finger prints, for detecting adulteration in food, flaws in machinery castings, etc. See X-Rays.

Radiolaria. Order of Protozoa. They have a large number of thread-like pseudopodia, and a flinty external skeleton or shell, often of great beauty. The single-celled body is usually spherical or conical in form, and the protoplasm is divided into inner and outer portions by a kind of membrane pierced with many pores, so that both are in vital connexion. All the Radiolaria are of microscopic size, and their skeletons form a considerable part of the ooze which covers large tracts of the ocean bed at moderate depths. At greater depths the ooze is exclusively radiolarian in character. Reproduction takes place mainly by fission; but at other times two kinds of flagellate spores are formed, and it is probable that these conjugate, thus exhibiting both sexual and asexual propagation. See Ocean.

Radiometer (Lat. *radius*, ray; Gr. *metron*, measure). Name given to an instrument invented by Sir

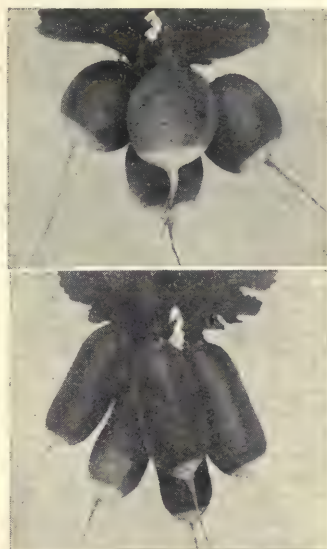


Radiometer invented by Sir W. Crookes

William Crookes to show motion caused by the action of light. It consists of a windmill with four metal vanes, each brightly polished or silvered on one side and blackened on the other. The four supporting arms are carried on a delicately pivoted

vertical rod, and the whole apparatus is enclosed in a high vacuum. When placed in the light the windmill revolves with a speed depending upon the intensity of the light. The action is probably due, however, to the difference of temperature of the blackened and silvered sides, the former absorbing more heat rays from the light and reacting on the molecules of the rarefied gas left in the vacuum.

Radish (Lat. *radix*, a root). Genus of annual and biennial herbs of the natural order Cruciferae and genus *Raphanus*. The garden



Radish. Bunches of two cultivated varieties of the vegetable

By courtesy of Sutton & Sons

radish (*Raphanus sativus*), whose native country is unknown, was introduced to Britain in 1548. Radishes prefer a light, rich soil, and thrive best in one which has been heavily manured for previous crops. Hence, when grown on a large scale, they should follow cabbages or other members of the Brassica genus. The first sowing in the open air should be made in March, in a sheltered position, and then, by making successional sowings once every three weeks until October, and subsequently in a heated greenhouse, a crop of radishes may be obtained all the year round.

The seed must be sown very thinly, as if planted too closely the roots will be hot in flavour and stringy. Radishes may be forced in a hot-bed by covering the seeds lightly and watering with tepid water. The long-rooted radishes are the best for early or spring sowing, and the round or turnip radishes for summer treatment.

Radium (Lat. *radius*, ray). One of the chemical elements. Its chemical symbol is Ra, atomic weight 226, melting point 700° C. ($1,292^{\circ}$ F.). Discovered by M. and Mme Curie in 1898, it was isolated in 1910 from radium chloride. It is a silver-white metal, which tarnishes rapidly on contact with air.

The chief source of radium is the mineral pitchblende, in which it appears in minute quantities, only a few grains to the ton, and from which it is extracted by a lengthy process. The uranium of the ore is removed and the residue treated with hot caustic soda, hydrochloric acid, and a strong solution of sodium carbonate, which gives a mixture of radium and barium carbonates. There are usually various impurities present, e.g. lead, calcium, etc. These are chemically separated, the process converting the radium and barium carbonates into chlorides. These last two are separated by fractional crystallisation. Radium is remarkable for its radio-active properties. In addition to pitchblende deposits of Joachimsthal in N. Bohemia, and elsewhere, the element is recovered from the mineral carnotite in the U.S.A., etc.

Radium is extensively used in medicine, especially in certain types of skin diseases, e.g. tuberculous lesions, in cases of exophthalmic goitre, sarcoma, carcinoma, rodent ulcer, etc. It has been given internally in certain forms for rheumatism. The element has also been used in the treatment of cancer, but the results are not sufficiently certain yet to say that it provides a cure for the disease. During the Great War radium and all radio-active substances were controlled. In Great Britain and the U.S.A. Radium Institutes exist for the supply, investigation, and medical treatment by the element. The address of the London Radium Institute is 16, Riding House Street, W. See X-rays; Uranium; Carnotite; consult also The Interpretation of Radium, F. Soddy, 1909.

Radius. Outermost of the two bones of the forearm. It articulates at its upper end with the humerus and the ulnar, and at its lower end with the scaphoid and

lunar bones of the wrist. The upper extremity or head is disk-shaped, and has a depression in the centre which articulates with a protuberance on the humerus. At the side of the disk is the articular surface which rotates in the small sigmoid cavity of the ulna. On the upper part of the shaft of the bone is a rough tuberosity to which is attached the tendon of the biceps.

The muscles attached to the shaft are the flexor sublimis digitorum, the flexor longus pollicis, the pronator quadratus, extensors of the thumb, the pronator teres, and the supinator brevis. The lower extremity has a large surface for articulation with the wrist, and, on its inner side, a small surface which articulates with the ulna. A

Radius (Lat., rod, ray). In geometry, name given to the straight line drawn to the circumference of a circle or the surface of a sphere from their centres.

Radius Vector. In astronomy, name given to the line joining the position of a planet at any point in its orbit to the sun. Since the planetary paths are ellipses, the length of the radius vector varies, and the shorter it becomes the faster the planet moves. This fact is stated in Kepler's second law, that the areas described by the radius vector of a planet in its orbit are proportional to the times taken in describing them.

Radlett. Village of Hertfordshire, England. It is 5 m. from S. Albans and 15 m. from London.



Radley College, Berkshire. School buildings and chapel

sharp protuberance of the bone, which can be felt on the outer side of the wrist, is known as the styloid process. When the arm is held in the position of supination, i.e. with the palm facing forwards, the radius is parallel to the ulna. When the arm is turned into the position of pronation, i.e. with the back of the hand facing forwards, the radius is crossed over the ulna.

Dislocation of the radius, which usually results from a fall on the hand, is most frequently in a forward direction, the head of the radius coming to rest against the lower end of the humerus. Reduction is effected by pulling on the wrist with the forearm bent at a right angle, pressure over the head of the bone being applied at the same time. Following reduction the arm should be kept at rest for several weeks.

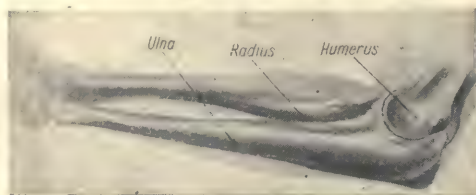
Fracture of the radius may occur at any part of the bone, but is most frequent at the lower end, being usually due to a fall in which the hand is stretched out palm downwards to break the fall. This is known as Colles's fracture (q.v.) See Arm.

on the Mid. Rly., and is a residential suburb of London.

Radley. Village of Berkshire, England. It stands on the Thames, 4 m. from Oxford, and has a station on the G.W. Rly. S. John's Church is a modern building, and the hall, once the seat of the Bowyer family, is now the college. Pop. 900.

Radley College. English public school. Founded at Radley, near Oxford, in 1847, its full name is the College of S. Peter. It is a Church of England school, incorporated by royal charter in 1890, and has about 200 boys. A memorial gateway has been erected, inside the double arches of which are inscribed the names, records, and portraits of the boys and masters who fell in the Great War.

Radnor. New. Village of Radnorshire, Wales. It stands on the river Somergill, 7 m. from Presteigne, with a station on the G.W. Rly. At one time a place of some size, it was incorporated in 1561, and retained its municipal privileges until 1883. There are remains of its castle, once a stronghold of the Mortimers, and part of the guildhall is shown. About 3 m. to the S.E. is the village of Old Radnor, which also had a castle. The waterfall known as Water-break-its-neck is 3 m. to the W. of New Radnor. Pop. 400.



Radius. Diagram illustrating relative position of bones of the forearm

Radnor, EARL OF. British title borne in turn by the families of Robartes and Pleydell-Bouverie. John Robartes, Lord Robartes of Truro (1606-85), was created earl in 1679. He had been a leading man on the parliamentary side during the Civil War, but was afterwards among the supporters of Charles II, under whom he was lord-lieutenant of Ireland, lord privy seal, and lord president of the council. The title became extinct on the death of the 4th earl, unmarried, in 1757. The estates, however, passed to relatives, and after a time to Thomas James Agar-Robartes, Baron Robartes (1808-82), whose son, the 2nd baron, became Viscount Clifden in 1899. He settled in Cornwall, where his descendants are still found, Lanhydrock, near Bodmin, the old seat of the earls of Radnor, being their property.

The second family of earls began with William Bouverie, Viscount Folkestone (1725-76), the descendant of a rich merchant of Huguenot descent. He was made earl of Radnor in 1765. His son took the additional name of Pleydell on inheriting wealth from his maternal grandfather, and subsequently the family name was Pleydell-Bouverie. From him the later earls, nearly all named Jacob, are descended. The earl owns much land at Folkestone, and his chief seat is Longford Castle, Wiltshire. His eldest son is called Viscount Folkestone. See Longford.

Radnorshire. Inland co. of Wales. Its area is 471 sq. m. In the E. and S. it is fairly level, but the rest of the shire is hilly, and there is some picturesque scenery in the valleys. The wild district in the centre of the county is known as Radnor Forest.

The principal river is the Wye; others are its tributaries, the Elan, Lugg, Arrow, and Ithon.

The Elan is utilised to supply Birmingham with water. An agricultural area, oats and wheat are grown and sheep are reared, while about half the land is under permanent pasture. The L. & N.W. and Cambrian Ryhs. serve the co., which unites with Brecon to send a member to Parliament. Presteigne is the co. town; others are Knighton, Rhayader, and Llandrindod Wells. In early times Radnorshire formed the district of Maesyfed, one ruled by the lords marchers after the conquest of



Radnorshire. Map of the inland mountainous county of Wales

Wales by Edward I. Its most notable ecclesiastical building was the rich Cistercian abbey known as Cwmhir. In 1536 it was made a shire on the English model, taking its name from Radnor, then an important place. Pop. (1921) 23,528.

Radom. Dist. of Poland. It is bounded W. by Kielce and Piotrków, N. by Warsaw and Siedlce, E. by Lublin, and S. by Galicia. The soil is in places very fertile, and the chief occupation is agriculture. There are numerous ironworks, sugar factories, tanneries, and distilleries. Its area is 4,700 sq. m. Pop. 1,160,000.

Radom. Town of Poland and capital of the dist. of the same name. It stands on the river Mlechna and the Ivangorod-Dombrova rly., about 60 m. S. of Warsaw. It has a considerable trade, especially in cattle, and tanning and distilling are important industries. It changed hands several times in the Great War, 1914-15. Pop. 49,000.

Radom, BATTLE OF. Fought between the Austrians and the Russians, Oct. 25-28, 1914. After their defeat at Ivangorod, Oct. 23, 1914, the Austrians were forced back to Radom on Oct. 24, and a heavy battle developed near that town next day, lasting three to four days. N. of the Ilzanka, a tributary of the Vistula, the German supports of the Austrians were trapped and suffered serious losses; as did the Austrians there and at other points in this thickly

forested region. The fighting around Radom itself, after a long succession of sanguinary duels in the woods, came to an end on Oct. 28 with the occupation of the town by the Russians. From Radom the Austrians retreated to Kielce (q.v.). The town was retaken by them, July 20, 1915, following the great Russian retreat.

Radomsk OR NOVO-RADOMSK. Town of Poland. It is in the dist., and 30 m. S., of Piotrków, on the Radomka and the Warsaw-Vienna rly. There are several spinning mills and furniture factories. Pop. 13,000.

Radomysl. Town of S.W. Russia. It is in the govt., and 60 m. N.W., of Kiev, on the Teterov. Trade is carried on in grain, cattle, and timber. Its old name was Myk or Mychek. Pop. 18,000.

Radowitz, JOSEPH MARIA VON (1797-1853). German soldier and statesman. Born Feb. 6, 1797, he



J. M. von Radowitz.
German soldier

entered the army, fought at Leipzig, and in 1830 was promoted artillery chief of staff in the Prussian army. A friend of Frederick William IV, he was employed in diplomatic missions, 1847-48, and in 1850 became foreign minister to Prussia for a few months. He died Dec. 25, 1853.

Radstock. Urban dist. and market town of Somerset, England. It is 16 m. from Bristol, with stations on the G.W. and Somerset & Dorset Rlys. The chief industry is coal-mining, the town being the centre of the Somerset coalfield. Market day, Sat. Pop. 3,700.

Rae, JOHN (1813-93). British explorer. Born in the Orkneys, Sept. 30, 1813, he studied medicine in Edinburgh, and in 1833 was appointed a surgeon in the Hudson Bay Company's service. In 1846-47 he undertook the exploration of Committee Bay, starting



John Rae,
British explorer
After S. Pearce

the next year to search for Sir John Franklin. In 1850 he made another attempt, and, combining survey with his search for the lost explorer, charted 700 miles of new territory. In 1853 he completed the survey of the W. coast of Boothia, and, incidentally obtaining definite news of Franklin's death, earned the £10,000 reward offered for the first information obtained to that effect. Between 1858 and 1864 he made other Arctic voyages, discovering and surveying new lands. He died July 24, 1893.

Rae Bareli. Dist. and town of the United Provinces, India, in the Lucknow division. The dist. has the Ganges in the S.W. and Lucknow dist. on the N. The annual rainfall is 38 ins. Rice, wheat, and millet are the chief crops. The town is in the middle of the dist. and is a rly. junction. Area, 1,745 sq. m. Pop., dist., 1,017,000; town, 17,300.

Raeburn, SIR HENRY (1756-1823). Scottish portrait painter. Born at Stockbridge, near Edinburgh, March 4, 1756, he was apprenticed to a goldsmith in Edinburgh. He soon began to paint water-colour miniatures of his friends, and, after studying with David Martin, passed to portraiture in oils. In 1778 he married Ann Leslie, a widow with means. On the advice of Reynolds, he set out for Italy in 1785, and, having worked for two years in Rome, returned to his profession at Edinburgh. He painted most of the notable Scotsmen and Scotswomen of the day. His portrait of Dr. Nathaniel Spens, perhaps his masterpiece, is in the Archers' Hall, Edinburgh, and both the Edinburgh National Gallery and Portrait Gallery are rich in his works. The portraits of Mrs. James Camp-

bell, Sir Walter Scott, and Sir John Sinclair may be noted. He was elected A.R.A. in 1814 and R.A. in 1815; knighted in 1822;



Sir Henry Raeburn, Scottish painter
Self-portrait

and in 1823 became the King's linner for Scotland. He died in Edinburgh on July 8 of the same year. See Braxfield, Lord; Constable, A.; Gow, Neil; Hamilton, Elizabeth; Home, John; Hutton, James; Melville, 1st Vis.; consult also Lives, W. E. Henley, 1890; W. R. Andrew, 2nd ed. 1894; Sir W. Armstrong, 1901; Virginibus Puerisque, R. L. Stevenson, new ed. 1899.

Raemaekers, LOUIS (b. 1869). Dutch cartoonist. Born at Roermond, Holland, April 6, 1869, he studied at Amsterdam and Brussels. He began by painting portraits, landscapes, genre, and posters, and was master of a drawingschool at Wageningen in Gelderland. In 1908 he started drawing political cartoons, and during the Great War be-



Louis Raemaekers,
Dutch cartoonist

came famous for his scathing satires on Kultur and its practical application in Belgium and elsewhere.

R.A.F. Abbrev. for Royal Air Force. See Air Force, Royal.

Rafa. Town on the Egyptian side of the Palestine-Egypt frontier. It lies 20 m. S. of Gaza, on the Mediterranean coast, and 30 m. from El Arish (q.v.). It was prominent in the British conquest of Palestine, and gave its name to the battle fought here in 1917.

Rafa, BATTLE OF. Fought between the British and the Turks, Jan. 9, 1917. After defeating and capturing a large number of Turks

at Magdhaba (q.v.) on Dec. 24, 1916, the British eastern force, after a fortnight's halt at El Arish, moved on to Rafa, on the Egyptian side of the Palestine border. Near there, at Magruntein, aeroplanes had located a strongly entrenched Turkish position. At sunset on Jan. 8, 1917, Anzacs, Yeomanry, the Camel Corps, with artillery, all under the command of Sir Philip Chetwode, and known as the Desert Column, made a swift march from El Arish, and early next morning New Zealanders occupied Rafa. The real struggle took place at Magruntein, but the battle is usually known as that of Rafa.

Sending a New Zealand regiment to watch the Turks on the E., Chetwode attacked the position at dawn, but for some time made small progress, as his men had little or no cover. In the afternoon the tide turned. Two of the Anzac brigades carried the S.E. works, New Zealanders attacked successfully in the rear, and the yeomen and the camelry took the lines on the S. and W. While Magruntein was thus stormed, the New Zealand regiment held up a Turkish relief force coming from the E. towards Rafa, and forced it to retreat. The surviving Turks in Magruntein surrendered, the number of unwounded prisoners being upwards of 1,600, including 35 officers and some German gunners. The casualties of the British were comparatively light in view of the nature of the attack. A striking result of the British victory was to clear the Turks out of northern Sinai for the first time for more than two years. See Palestine, Conquest of; Sinai, Occupation of.



Louis Raemaekers. One of the Dutch artist's most telling cartoons, *The Triumph of the Zeppelin*. The motherless child is saying: "But mother had done nothing wrong, had she, daddy?"

Rafat. Village of Palestine, known also as Refat, 20 m. E. of Jaffa, in the foothills of Mt. Ephraim. Along with Kefr (*q.v.*), it was captured by the British, April 9, 1918. It was from the coast to Rafat that Allenby launched his final offensive against the Turks, Sept. 19, 1918. See Palestine, Conquest of; Shechem. Battle of.

Raff, JOACHIM (1822-82). Swiss composer. Born at Lachen, Schwyz canton, May 27, 1822, he studied science, but turned to music, being early encouraged by Mendelssohn. Closely associated with Liszt from 1850, he was an enthusiastic supporter of Richard Wagner, publishing a book, *Die Wagner-Frage*, in 1854. He settled in Wiesbaden, 1855, became director of the Conservatoire of Frankfurt-on-Main, 1877, and died there on June 24, 1882. Among his numerous works are violin concertos and sonatas, several operas, and the programme symphonies *Im Walde* and *Lenore*.

Raffaellino della Colle (1490-1566). Italian painter. He was born at Colle in Tuscany, and studied under Raphael, whom he helped in the Vatican and Farnesina palaces at Rome. Later he became a pupil of Giulio Romano (*q.v.*). His principal works are the Resurrection and the Assumption, both at Borgo San Sepolero.

Raffia Work. The manufacture of a variety of articles from bast dyed in different colours. Raffia has long been used in Kindergarten and other schools for young children as a good and inexpensive medium for manual training. It is usually obtained ready dyed. It is damped slightly and is then twisted on a board cut in the shape of the required object, or it may be plaited and used to make various articles, just as straw plait is used, with the advantage that it is more pliable and therefore easier to handle.

When raffia is used for coarse but very effective embroidery, it is more satisfactory for the workwoman to dye the raffia herself to the exact colours required. Sometimes raffia is used as any other thread would be used, and embroidered straight on to the material; in other cases motives in raffia work are first made and then applied to the material in the same way as in other appliqué work.

Raffles, SIR THOMAS STAMFORD (1781-1826). British administrator. Born at sea, off the coast of Jamaica, July 5, 1781, he entered the service of the East India Company in 1795, and ten years later was sent to Penang, where he acquired great proficiency in the

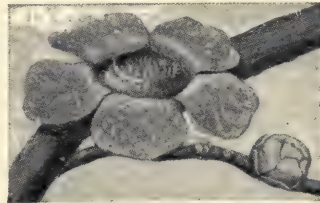


native languages. In 1811 he was made lieutenant-governor of Java, a position which he occupied with distinction until the cession of the island to Holland in 1816. In 1818 he became governor of Bencoolen, Sumatra, and by his advice Singapore was acquired by the E.I. Company, 1819. He proceeded thither in 1822 to establish a government. He died July 5, 1826, having returned to England two years previously. During his residence in the East, Raffles made extensive scientific observations. See *Life*, D. C. Boulger, 1897.



Sir Stamford Raffles, British administrator

Rafflesia. Genus of leafless and stemless parasites of the natural order Rafflesiaceae. They are natives of the East Indies. The vegetative portion of the plant consists of threads, like the mycelium of a fungus, in the tissues of species of vines and figs, the only external evidence of its presence being afforded when the huge



Rafflesia. Flower of *R. arnoldi*, the leafless and evil-smelling parasite

flower-bud breaks forth. The first species, discovered by Dr. Arnold and Sir Stamford Raffles in 1818, was *R. arnoldi*, three feet across the opened flower. It is very succulent, and the petals, etc., vary from a quarter to three-quarters of an inch thick, of a reddish tint, and a smell like carrion which induces flies to fertilise it.

Raft (mid. E., spar, rafter; cf. *Gr. orophos*, roof). Collection of pieces of timber fastened together for support on the water. It is used for planks sent down to their destination by being allowed to float down a river. A raft bridge is a

bridge supported on rafts, and a raft port is a square hole which some ships have for loading and unloading timber. Rafts are also carried on ships as part of their life-saving equipment.



Raft. Life-saving raft designed by H. J. Matson. It is made to fall upright in the water, either side being available for use. It contains a hatch with water tanks and food compartments. The lower illustration shows the raft on deck, ready for sliding overboard if required

Rafter. One of the sloping timber beams in a roof, which support the weight of the roof covering. They are usually 2 ins. wide



Rafter. Roof of Merchant Adventurers' Hall, York, showing rafters Courtesy of Country Life, Ltd.

and from 3½ to 5 ins. deep for short spans where they receive intermediate support, as from a purlin, but vary in width from 1½ ins. to 2½ ins., and in depth up to 10 or 12 ins. for long spans without intermediate supports. They are generally spaced about 12 ins. apart centre to centre. See *Building*.

Ragaz OR RAGATZ. Watering-place of Switzerland, in the canton of St. Gall. Situated at the entrance of the narrow valley of the Tamina, 31 m. S.E. of St. Gall and 1½ m. from Pfäfers (*q.v.*), it has various baths fed by the mineral waters of Pfäfers, a kursaal, etc. Some 30,000 invalids annually visit the resort. The resident pop. is less than 2,000.

Ragged School. Name given to free schools for poor children established by philanthropists early in the 19th century in Great Britain. The movement had its counterpart in Germany about the same time. Among the pioneers were T. Cranfield in South London (1810), John Pounds (*q.v.*) at Portsmouth, and Thomas Guthrie (*q.v.*). A free school where the children were also fed was opened in Aberdeen in 1841, and the Field Lane Refuge in London, 1843. In the following year the Ragged School Union was founded to co-ordinate various charitable agencies for the care and instruction of the destitute poor, and of outcast children in particular. Day and night schools were established, as well as Sunday schools. In 1914 the title was changed to The Shaftesbury Society and Ragged School Union. See Sunday School.

Raglan. Village of Monmouthshire, England. It is 7 m. from Monmouth, with a station on the

52 he was military secretary to Wellington, whom he succeeded as master-general of the ordnance. In



1st Baron Raglan.
British soldier
After A. Morion

in charge until his death, June 28, 1855. (See Crimean War.) He married a niece of Wellington, and his son, Richard (1817-84), became the 2nd baron. The 3rd baron, George (1857-1921), was governor of the Isle of Man, 1902-19.

Ragman Roll. Corruption of Ragimunde's Roll, a record of information regarding the benefices of the Scottish clergy, compiled for purposes of papal taxation by

a papal legate named Ragimunde. Later the term was transferred to the rolls of parchment recording the acts of homage made to Edward I at Berwick in 1296. This document, which is a valuable source of information on the state of Scotland, was published by

the Bannatyne Club in 1834.

Ragnarok. Norse name for the Götterdämmerung or The Twilight of the Gods. See Götterdämmerung.



Ragusa, Dalmatia. The custom house, built early in the 16th century and long used as the mint

Ragoût (Fr.). Highly seasoned relish, made of vegetables, truffles, sweetbreads, mushrooms, etc., and served with any savoury dish. Less correctly the name is given to a highly seasoned stew of mutton or other meat that has been cooked before. *Pron.* Rag-oo.

Rags. Scraps and waste pieces of textile materials. New rags, *e.g.* the clippings from tailoring factories, return quickly to commerce. Cotton and linen rags of value in paper-making are separated forthwith from woollens, as are the pocketings and linings of wool clothing. Rags eligible for remanufacture into woollen cloth are carefully graded according to their kind and colour.

Drying is the first process in manufacturing from rags. The expulsion of moisture facilitates the removal of dust by a machine in which the rags are whirled and beaten. After being oiled to minimise the breakage of fibre, the rags are disintegrated in a grinder, or devil, into which they are delivered by a travelling apron. Feed rollers grip the rags, and the hardened steel spikes of a revolving drum tear the woven fabric and throw the fibre forward, while any untornd cloth is automatically returned to the front by a fan-wheel. The woven structure is broken up, but threads remain imperfectly opened, and are separated into fibre in subsequent opening machines or upon the carding engine. See Shoddy.

Ragtime. In music, a form of syncopation by prolongation used by American composers and their imitators in modern coon songs. Claimed as original, it has, however, been used in some form in all ages. The meaning of the word is obscure.

Ragusa. Seaport of the Adriatic Sea, in Dalmatia, Yugoslavia; the Slav name is Dubrovnik. It is surrounded by a wall with numerous towers. City life centres round the Corso, which was once an arm of the sea. The



Ragusa arms

buildings include the former palace of the rulers of the republic, and the custom house, formerly the mint, and the cathedral, which was finished in 1713. The harbour being partly closed by sand, large vessels use Gravosa, 1 m. distant. Oil, silk, leather, and liqueurs are produced. Subject at various times to neighbouring states, it rose under the suzerainty of Turkey to power over an area of 500 sq. m., and became



Raglan, Monmouthshire. Main gateway of the ruined castle
Frith

G.W. Rly. Above the village stand the extensive and imposing ruins of Raglan Castle. Including a gateway and remains of the hall and towers, they give a good idea of the nature of a feudal stronghold. The first castle, built here by the Normans as a protection against the Welsh, was replaced in the 14th century by a more massive structure. In 1646 it was defended for ten weeks against the parliamentarians, after which it was surrendered and dismantled. The village church of S. Cadoc has some memorials of the Somerset family Pop. 600.

Raglan, FITZROY JAMES HENRY SOMERSET, 1ST BARON (1788-1855). British soldier. A younger son of the 5th duke of Beaufort, he was born Sept. 30, 1788. Educated at Westminster School, he entered the army in 1804 and during the Peninsular War served on Wellington's staff. At Waterloo he lost a hand. After the war he was secretary to the British embassy at Paris, and sat in Parliament for Truro, 1818-20 and 1826-29. From 1827-

a great commercial city. Plagues and the earthquake of 1667, when a fifth of the pop. perished, terminated its prosperity. Napoleon seized it in 1806, two years later it ceased to be independent, and in 1814 it was given to Austria. Pop. 12,000.

Ragusa. Town of Sicily, in the prov. of Syracuse. It stands among hills at an alt. of 1,630 ft., overlooking the river Ragusa, 3 m. W. of Modica and 32 m. W.S.W. of Syracuse. The neighbouring rocks contain caverns with ancient tombs. Ragusa has been identified by some with the ancient Hybla Heraea, and by others with Ina. Manufactures include cotton and woollen goods. Pop. 40,000.

Ragwort (*Senecio jacobaea*). Perennial herb of the natural order Compositae. It is a native of Europe and Asia. It has leafy stems about 4 ft. high, with deeply lobed,



Ragwort. Flower-heads of the wayside flower

dark green leaves, and large clusters of bright yellow, rayed flower-heads. The bruised leaves give off an unpleasant odour.

Rahotep. Egyptian prince of the IIIrd dynasty. The mastaba-tomb of him and his wife Nefert, near Seneferu's pyramid at Medum, discovered by Daninos in Mariette's time, yielded two incomparable painted limestone portrait-statues, 4 ft. high, on stone seats, now in Cairo. A British Museum bas-relief from the tomb portrays Rahotep seated before a table of offerings, with hieroglyphs. See Egypt.

Rahu. Dragon or demon of Hindu mythology. It is believed to cause eclipses of the sun or moon.

Raibolini, FRANCESCO. Real name of the Italian painter, Francesco Francia (q.v.).



Ragusa, Dalmatia. The ancient town and harbour, on the east shore of the Adriatic, seen from the west

Raichur. Dist. and town of Hyderabad, India. The district is in the Marathwara division in the S.W. of the state, being adjacent to Bombay and Madras Presidencies. Nearly the whole of the cultivable area is in use, mainly for native food grains. The rainfall is 22 ins. The Kistna and Tungabhadra rivers form the N. and S. boundaries. Area 6,791 sq. m. Pop. 994,000. The town is centrally situated on the Bombay-Madras Rly. Pop. 25,000.

Raid. In international law, a hostile invasion of territory of a state at peace, undertaken without the sanction of any recognized political community. Historic examples are the Fenian Raid, from the U.S.A. into Canada, in 1866; and the Jameson Raid into the Transvaal, 1895-96. Such raiders have no claim to the rights of belligerents at the hands of the country invaded, which may deal with them according to its own laws.

Further, in international law, the country from which the raid was organized is liable for damages, if negligence on its part can be proved. In Britain the organization of, or participation in, a raid into a friendly country is a crime under the Foreign Enlistment Act. During the Great War the term raid, or trench raid, was applied to attacks by day or night on opposing trenches by small bodies of men for the purpose of demoralising the enemy, and of identifying by the prisoners taken the units engaged in a particular part of the line, and air raids to attacks by enemy aircraft. See Air Raids; Jameson Raid; Trench Warfare.

Raiffeisen, FRIEDRICH WILHELM (1818-88). German economist and founder of agricultural cooperative banking. Born at Hamm on the Sieg, Rhineland, March 30, 1818, he entered public life as burgomaster from 1845 onwards at various places, including Heddendorf, near Neuwied, where he died March 11, 1888. In 1847 he established the

first agricultural cooperative bank. This soon found imitators, and in a few years a network of Raiffeisen banks spread over the country. See Agricultural Credit Banks; Cooperation.

Raikes, ROBERT (1735-1811). British philanthropist. Born at Gloucester, Sept. 14, 1735, his father was the proprietor of The Gloucester Journal. In 1757 he succeeded to the family business, which he carried on until 1802. Mean-



Robert Raikes, British philanthropist

while, he had become interested in the question of prison reform, but it was his establishment of a Sunday school in Gloucester in 1780 that made his fame, for his venture was the beginning of that movement. He died April 5, 1811. See Sunday Schools.

Rail. Name given to birds of the family Rallidae, distributed over many parts of the world and distin-



Rail. The water-rail, a swimmer and diver that nests in the sedges

W. S. Berridge, F.Z.S.

guished by having laterally flattened bodies suitable for passing through dense undergrowth. They are comparatively long in the leg and toes. The tail is short and inconspicuous, the head small, and the beak usually rather long and more or less curved at the tip. In Great Britain the family is represented by the corn-orake, coot, water-hen, and water-rail. The last named occurs sparsely in the fens and marshes. The plumage is olive-brown on the upper parts and grey below, and it has a conspicuous red beak. It is about 11 ins. long, and is to be found all the year round. It nests among the sedges by the sides of ponds and streams, is a strong swimmer and diver, and flies only when compelled. Three other rails, the spotted rail, the little rail, and Baillion's rail, occur in Great Britain. See Coot.

Rail Creep. Fault produced upon railway lines by constant traffic. Under the rolling action of trains there is a tendency for the track rails to move or creep in the direction in which the heaviest traffic passes, especially on descending grades. Such movement, known as rail creep, sets up stresses at the rail joints when allowance is made for expansion and contraction. The movement is cumulative and results in closing up the expansion spaces between the rail-ends over a considerable length of line, at the same time displacing the sleepers. If not corrected periodically it ultimately brings about warping of the rails and a kink in the track.

Railing. Fence made of posts and rails. Such are erected around enclosures of various kinds, e.g. a cricket ground, where it is neither possible nor desirable to erect walls. A railing may be of wood, iron, or other metal, and is usually formed of bars laid horizontally and supported by posts.

Railway and Canal Commission. British judicial body. It was first appointed in 1873 and reorganized in 1888, and decides questions at issue between the rly. companies and traders and the public generally. It consists of two regular commissioners, who are assisted by three judges, one each from England, Scotland, and Ireland. The British rlys. are controlled by the Government to a much greater extent than are other commercial undertakings, and the commission exists to enforce this control with regard to rates, fares, etc. Since 1893 the commission has possessed powers, under certain conditions, to reduce the hours worked by rly. servants. There is also a commission, similarly constituted, for promoting the construction of light railways in England and Wales.

Railway Clearing House. Institution in London for dealing with the through traffic on the railways of Great Britain. There the financial relations of the various companies are adjusted. It was established in 1842, and is at Seymour Street, Euston Square, N.W. Its affairs are managed by a committee consisting of one representative from each of the rly. companies. The departments are the secretarial, merchandise, mileage and demurrage, and coaching. There is a clearing house for the Irish railways in Dublin (5, Kildare Street), and other countries have similar institutions.

Railwaymen, NATIONAL UNION OF. British trade union. It was formed in 1913 by the amalgamation of the Amalgamated Society of Railway Servants, founded in

1872; the General Railway Workers' Union, of 1889; and the United Pointsmen and Signalmen. Its defined object was "to secure the complete organization of all workers employed on or in connexion with any rly. in the United Kingdom." With the Miners Federation and the Transport Workers

RAILWAYS: STEAM, ELECTRIC, ETC.

A. Williams, Editor, *Engineering Wonders of the World*

This article deals with the various kinds of railways, and the progress made in developing this form of transport. In connexion with the subject, see Brake, Engineering; Locomotive; Points; Signalling; Sleeper; Steam Engine; Steel. See also Canal; Rocket; Transport; biographies of Stephenson and other engineers, and entries on the various railway companies, e.g. Midland

The germ of the modern rly. is to be found in the tracks formed of wooden planks and rails which were laid down in the Newcastle district, as noticed by Lord Keeper North in 1676, with the object of facilitating the haulage by animal power of wagons or trams of coal. To reduce the wear on these wooden rails by laying sheets of iron on them was an obvious expedient, and the further improvement of making them entirely of iron dates from the latter part of the 18th century, when also they were cast L-shape, the upright portion, 2 or 3 ins. high, being added on one side of each to prevent the wheels from running off the track.

Such rails, known as plate rails, were obviously an inconvenience to the traffic on an ordinary road which the railway had to cross, and it was for that reason that in 1789 William Jessop, of the Butterley Ironworks, conceived the idea of fixing the projecting portion not on the rail but on the wheel, and making it run in a groove formed in the plates. This was actually the method adopted in laying the Loughborough and Nantpantan rly. across a main road, but on other parts of the line, instead of a groove being formed for the projecting part or flange, edge rails were used. These may be regarded as plate rails in which the wheels were made to run on the top of the upright portion of the L, instead of on the flat horizontal part, the wheel flange projecting down the side. These edge rails gradually developed into the modern type of rail now universally employed, though the term plate-layer still used of the men who look after the permanent way of a railway is a reminiscence of the old plate rail.

The early tramways or rlys. were intended for the private use of their owners, and the first public line was the Surrey Iron Rly., a plate-way about 9½ m. long from Wandsworth to Croydon, which was authorised by Parliament in

it formed the so-called Triple Alliance of the British labour movement. It called a general strike beginning Sept. 26, 1919, which lasted for nine days, one of the main issues being the standardisation of rly. wage scales. Its headquarters are at Unity House, Euston Road, London, N.W. See Trade Unions.

1801. Here animal traction was employed, and the first application of steam traction is credited to Richard Trevithick on a plate-way in South Wales in 1804. The Stockton and Darlington Rly., opened in 1825 and now merged in the N.E. system, is the oldest passenger rly.; it was laid with edge rails, and the original intention was to use animal power, but at the instance of George Stephenson the steam locomotive was adopted instead. It was, however, the Liverpool and Manchester Rly., opened in 1830, which finally established the supremacy of the steam locomotive.

The years in which various countries first opened steam rlys. are: Austria and France, 1828; United States, 1829; Belgium and Germany, 1835; Russia, 1838; Italy, 1839; Switzerland, 1844; Spain, 1848; Canada and Mexico, 1850; Sweden, 1851; Norway and India, 1853; Portugal, Brazil, and Australia, 1854; Egypt, 1856; South Africa and Turkey, 1860; Japan, 1872; and China, 1887.

According to recent statistics there are nearly 700,000 m. of rly. in the world, rather more than half the total being claimed by the New World. The mileage of state-owned rlys. is less than half that of company-owned. In Great Britain and Ireland, at the end of 1913, the route mileage was 23,691, and the single-track mileage, including sidings, 55,405, according to the board of trade rly. returns. The net paid-up capital of the companies, after deduction of duplications and of nominal additions due to conversion, consolidation, and division of stock, amounted to £1,124,289,000. The number of passengers "originating on the systems of the different companies" was 1,591,146,000, including an estimate of the journeys made by season ticket holders, and the weight of goods and minerals 372,037,000 tons, with 23,544,000 live stock. The gross receipts from all sources were £139,451,000, and

the expenditure £87,320,000, the net receipts being thus £52,131,000.

THE RAILWAYS ACT, 1921. During the war, and after it until Aug. 15, 1921, the great bulk of the British rlys. were under Government control. During this period the gross revenue increased, because the traffic was very heavy and large successive increases were made in the passenger fares and goods rates; but the working expenses increased in a still greater ratio, chiefly owing to the payment of higher wages to the employees, and the institution of an eight-hours day. The consequence was that in 1920, while the gross revenue was barely double what it was in 1913, the expenditure had increased more than threefold, and, according to the figures prepared by the Railway Accountants Committee (which are not in the same form as those of the board of trade returns), the total net receipts of the controlled companies from all sources had fallen from £45.6 millions in 1913 to £8.9 millions in 1919, and to less than £6 millions in 1920. The pre-war revenue sufficed to pay an average of about 4 per cent. on the whole capital invested; that of 1920 was less than half the amount required to meet the fixed interest on the debenture and rent charge stocks.

In these circumstances the problem had to be faced of restoring, if possible, the financial stability of the rlys., and of putting them again on a dividend-earning basis; and it was largely for this purpose that the ministry of transport was formed by an Act passed on Aug. 15, 1919. One result of its efforts was the Railways Act, which became law in Aug., 1921. Broadly speaking, this measure was based on two main principles: (1) Reduction of expenditure by economy in management and administration, and by the elimination of the losses attributed to wasteful competition between the different rly. companies; and (2) increase of revenue through higher charges, to the extent necessary to bring the rlys. to the position of self-supporting commercial undertakings.

British Railway Groups

In pursuance of the first of these principles the Act provided for the reorganization of the railways in Great Britain by amalgamating them into four large groups. (1) *Southern group* (London and South-Western, London, Brighton and South Coast, and South-Eastern and Chatham); (2) *Western group* (Great Western and the railway companies in South Wales); (3) *North-Western, Midland and West Scottish group* (London and North-

Western, Midland, Lancashire and Yorkshire, North Staffordshire, Furness, Caledonian, Glasgow and South-Western, and Highland); and (4) *North-Eastern, Eastern and East Scottish group* (North-Eastern, Great Central, Great Eastern, Great Northern, Hull and Barnsley, North British and Great North of Scotland). In 1923 the group system was finally settled, and the official titles chosen were: Southern; Great Western; London, Midland and Scottish; London and North-Eastern. The Great Western retained its name. (See Map, p. 2914).

In addition to the constituent companies named, each group was to include a number of smaller subsidiary companies. Roughly, the grouping was designed on a territorial basis, but no group had an area entirely to itself. The Southern and Western groups, for example, actually intertwined in Devonshire, the North-Western group penetrated the Western group in South Wales, and touched the Eastern group at points like Cambridge, Lincoln, and Doncaster; the Eastern group threw out tentacles to the North-Western at Carlisle, and in Scotland the North-Western group cut across the Eastern group to Aberdeen, and the Eastern across the North-Western to Mallaig on the West Coast.

Fixing of Rates

For the purposes of these amalgamations the Act set up a special Amalgamation Tribunal, and it provided that the schemes should be framed to come into operation on July 1, 1923. The underground rly. companies in London were not mentioned in the Act, and may be regarded as forming a group by themselves. A few small lines in other parts of the country were also omitted from the scheme.

As regards the charges to be made for the conveyance of traffic, the Act provided for the establishment of a Rates Tribunal, the permanent members of which were appointed in Nov., 1921, which should fix them in such a way that the companies would secure an annual revenue equivalent to their annual net revenue in 1913.

TRANSCONTINENTAL RAILWAYS. Long transcontinental lines have had an incalculable effect, politically and commercially, in consolidating the countries through which they run, opening vast areas to settlement and trade, and quickening transit from sea to sea. The first transcontinental rly. route in North America was completed in 1869 by the junction of the Union Pacific and the Central

Pacific from Omaha to San Francisco, and before the end of the 19th century four others had been added.

In Canada the Canadian Pacific (1885) was the first transcontinental line, stretching under one ownership from the Atlantic to the Pacific. In S. America the last section of a rly. from Buenos Aires to the Chilean coast was finished in 1910. The Trans-Siberian Rly., giving through rly. communication from European Russia across Asia to the Pacific, was completed in 1902, except for a short section at Lake Baikal, which was constructed in 1904.

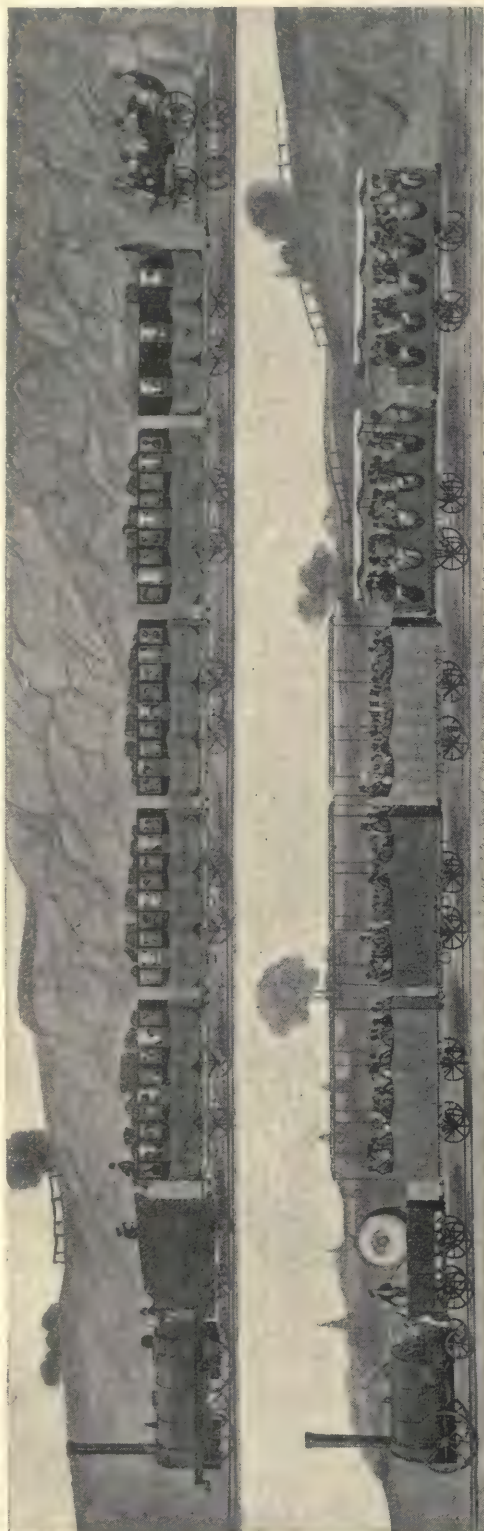
THE PERMANENT WAY. It is essential that the sleepers on which the rails are carried, shall be firmly supported by material which will keep them in position, be easily packed under them when necessary, give good drainage, and distribute the pressure over a large surface. The "ballast" used for this purpose consists of broken stone, broken slag, gravel, and sometimes cinders. It is distributed evenly over the road bed to a depth of about 12 ins., and levelled to grade. When the sleepers are in position on top, more ballast is added till it is level with their upper surface, and they are well "tamped" by driving the material beneath them. The total width of ballast, including slopes of about 45° at the sides, is about 25 ft. for a double track.

Types of Sleepers

Transverse sleepers are now used almost universally. The materials employed are wood, cast iron, steel, and, to a limited extent, reinforced concrete. Wood sleepers for standard gauge (4 ft. 8½ ins.) heavy-traffic tracks in Great Britain are 9 ft. long, 10 ins. wide, and 5 ins. thick. At crossings they are longer, to give room for more than two rails; and at each side of rail joints a couple of inches wider. They are spaced about 30 ins. apart, centre to centre. The life of good sleepers is greatly prolonged by impregnating them with hot creosote or some other preservative, forced into the pores under a pressure of 100 lb. to the sq. in.

Metal sleepers are much used in Germany and India. In the latter country and Argentina several thousand miles of rails are supported on large iron "bowls," each pair of bowls being connected by a transverse tie rod to keep the gauge correct.

There are two main types of rails: (1) the "bull-headed," carried in cast-iron chairs bolted to the sleepers; and (2) the flat-bottomed or flange, secured directly



Railways. Passenger trains on the Liverpool and Manchester Railway, opened in 1825. Top, mail train with first-class carriages; beneath, train with second- and third-class carriages, having roofs, but otherwise exposed to the weather

From a print of 1833

to the sleepers. The first is employed almost exclusively in Great Britain, but in most other countries the flat-bottomed is preferred.

Rails are rolled from steel ingots, and stringent regulations are imposed as to chemical composition, variation from standard sectional and length measurements, and behaviour under test. Rails of all sections have been carefully standardised as regards height, width, thickness of web, curves at corners, and proportionate area of parts. The tendency is to increase the weight of rails, and tracks designed for heavy and frequent traffic are laid with rails weighing 90–100 lb. per yard run. On British railways the standard lengths are 30, 36, 45, and 60 ft. Long rails give smoother running by decreasing the number of joints per mile; but the gaps which must be left at joints to allow for expansion are necessarily greater in proportion.

Method of Fastening Rails

The cast-iron "chairs" in which bull-headed rails rest weigh 40 or 50 lb. each. They are secured to the sleepers by two, three, or four fastenings—coach-screws, bolts, spikes, and oak trenails—not more than two of the last being permitted in a chair with four holes. A key of hard wood is driven between the rail and the outer wing of the chair to prevent movement.

The cheapest means of fixing flat-bottomed rails is the square-shanked, chisel-pointed spike with a projecting head. It is quickly driven, but much less reliable than the coach-screw or bolt employed in the best tracks. To prevent the rails from cutting into the sleepers, metal plates ("tie-plates") with holes for the spikes may be interposed. They are flanged on the lower side to grip the sleepers.

A rail joint thoroughly satisfactory in all respects has yet to be discovered. The compromise generally adopted is the "suspended" joint, with rail ends butting between sleepers and supported by fish-plates, one on either side, clamped together through the rails by bolts. The bolt holes are slightly larger than the bolts, to give room for expansion and contraction. It has been proved that the jolting at joints is due rather to the bending of the rails than to the "jump" across the gap, and the ordinary fish-plate does not prevent bending. Various forms of "bridge" joints, extending from sleeper to sleeper, and supporting the rails underneath as well as at the head, have been tried.

The majority of the rlys. of the world are laid on the normal or standard gauge of 4 ft. 8½ ins., as measured between the insides of the rails, or with the 4 ft. 9 ins. gauge, which in practice is identical, since rolling-stock designed for the one can run on the other. But a number of other gauges are to be found. For example, the 5 ft. 6 ins. in Spain, Portugal, India, and S. America; the 5 ft. 3 ins. in Ireland and Victoria; the 5 ft. in Russia; and the 3 ft. 6 ins. in S. Africa, Queensland, New Zealand, the Sudan, and Japan. Other gauges used on the less important lines in various countries are the metre (3 ft. 3 ins.), the 2 ft. 6 ins., and the 2 ft. gauge.

Both gradients and curves are undesirable because they increase train resistance, and, therefore, add to the cost of operation, but in practice they are unavoidable. Since the interior of all countries is higher than the seaboard, any line that runs inland from the coast must be laid on an ascending gradient, and, further, the local elevations and depressions of the surface which



automatic couplings; and (2) loose coupled stock without continuous brakes. Most goods wagons fall into the latter class.

In America long open cars, with a passage along the middle and seats on each side, are standard for passenger traffic. In the British

it will encounter, and which will be encountered even by a rly. that hugs the sea, will necessitate changes in the steepness of the ascent, with occasional stretches of descending gradient, and also the introduction of curves. To what extent the engineer will preserve uniformity of gradient and straightness by taking the line through elevations in cuttings or tunnels and across depressions on embankments or viaducts will depend on circumstances. On British rlys. the steepness of a gradient is defined by stating the distance in which there



Railways. 1. Engine and coach of first train in the U.S.A., which ran from Albany to Schenectady, Aug. 3, 1831. 2. Metal railway ticket, Leicester and Swannington Rly., opened July 17, 1832. 3. Interior of Euston station, London, c. 1840. 4. First down train on the Metropolitan Rly., London, passing Praed Street junction, Jan. 10, 1863. 5. Train with uncovered 3rd class carriages, c. 1860

3, by courtesy of L. & N.W. Rly.

is a rise or fall of one unit, while in America a percentage notation is employed; thus a gradient of 1 in 100 is the British equivalent of the American 1 p.c. grade, and 1 in 200 is a half p.c. grade. The weight of the trains that can be hauled by a single locomotive over a given length of line is determined by the steepest gradient occurring on it, and this is therefore known as the ruling gradient; but in some cases, where the trains can "rush" the ascent by the aid of the momentum previously acquired, a gradient steeper than that fixed on as the ruling one may be allowed, while in others the trains may be assisted up by a "bank" or "pusher" engine. A gradient exceeding 1 in 166 is now considered steep for express traffic; but many steeper gradients are to be found even on important lines, e.g. the Lickey incline on the Midland main line south of Birmingham

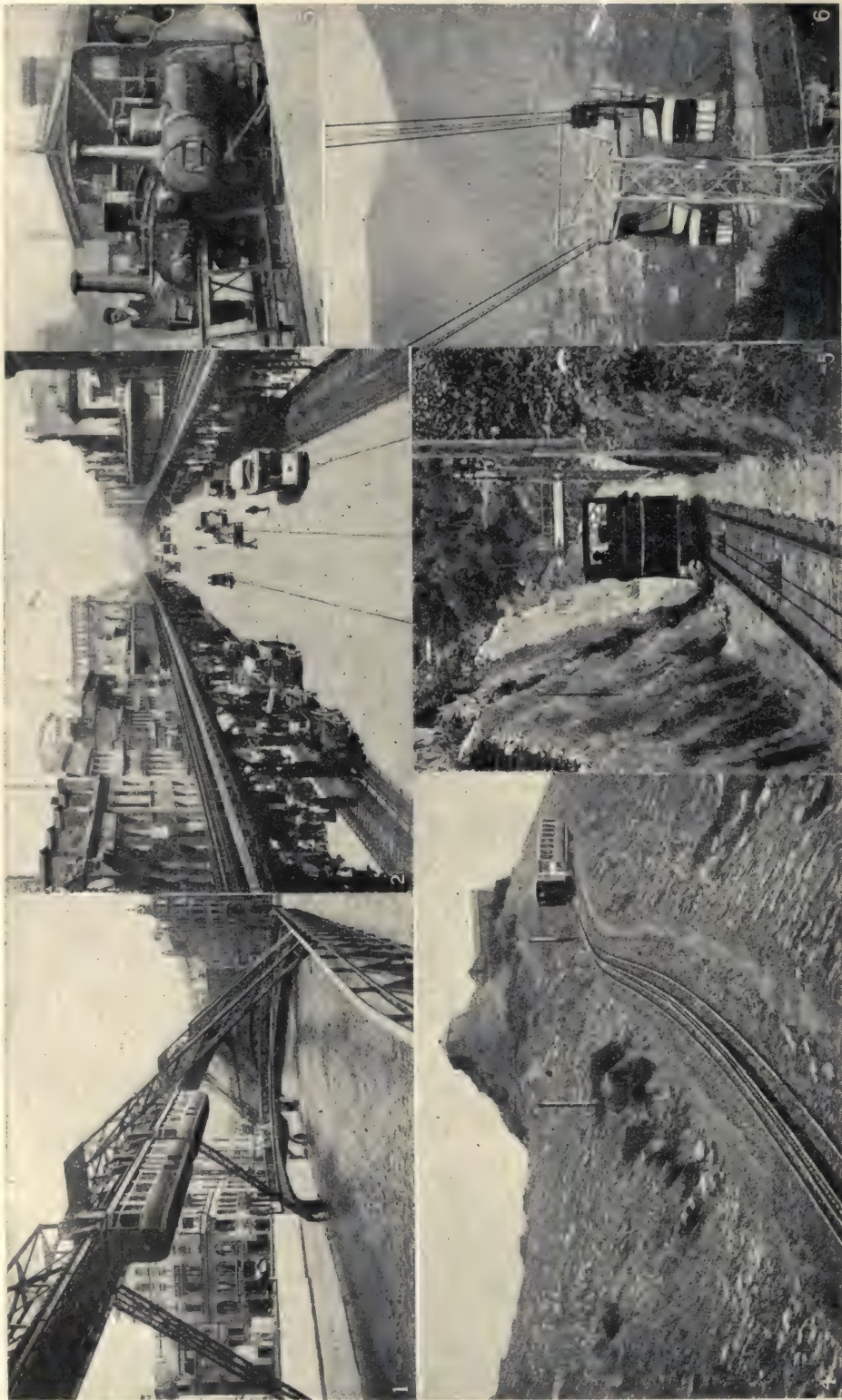
runs on a slope of 1 in 37 for two miles.

The degree of curvature of a simple circular curve is expressed in Great Britain by stating the length in chains (1 chain = 66 feet) of the radius of the circle. In America the degree of a curve is the angle at its centre subtended by a chord of 100 ft. Besides increasing resistance, curves are objectionable, because they tend to derail the trains. To prevent accidents of this kind the outer rail of the curve is laid somewhat higher than the inner one, the tilt thus given to the train counteracting the overturning tendency.

ROLLING STOCK. In the United Kingdom railway rolling stock is classified under two heads: (1) Coaching stock, including passenger cars, mail vans, and other vehicles fitted with continuous brakes and closely coupled together by means of screw couplings, or, occasionally,

Isles cars of this type are used on some electric rlys., but carriages with separate compartments are still retained for local trains driven by steam. Long distance trains are usually composed of corridor or vestibule stock with lavatory accommodation, dining cars, and at night sleeping cars for first-class passengers. Formerly the chief British rlys. issued first, second, and third class tickets, but the Midland Company abolished second class in 1875, and its example has since been largely followed. Trains de luxe for trans-Continental travel have many of the conveniences of an hotel, such as separate state rooms, library, smoking-room, barber's shop, bathroom, and typist's room.

Passenger trains are commonly heated by steam from the engine, transmitted through train pipes to radiators in the carriages, and are lighted by gas or electricity.



1. Electric suspension railway between Barmen and Elberfeld, Germany. 2. Grand Street, New York, with the Elevated Railway on each side. 3. Front of train on the Lartigue monorail between Listowel and Ballybunion, Ireland. 4. Cog railway from Llanberis to the summit of Snowdon. 5. Cable funicular from Meiringen to Reichenbach Falls, Switzerland. 6. Electric suspension rope-way from Kohlern down to Bozen, Italian Tirol

RAILWAYS : MOUNTAIN, STREET, AND OTHER SPECIALISED FORMS OF PASSENGER TRANSPORT

Freight wagons and vans are of many types and capacities. The majority of open wagons used in Great Britain are four-wheeled, have a tare (weight empty) of 6-7 tons, and carry loads of 10-12 tons. Bogie wagons for coal and ore take up to 40 tons, and special vehicles are provided for the transport of exceptionally heavy loads, such as large castings, guns, and girders. In the United States, where the "long haul" is the rule rather than the exception, the long 50-ton car, built almost entirely of steel and carried on bogie trucks, is becoming the standard for handling most kinds of freight. Speaking generally, the weight of a wagon relatively to that of its load decreases with size, and the employment of large wagons reduces the dead or non-paying load to be hauled. There are serious difficulties in the way of introducing very long wagons for general service in England, weigh-bridges, turntables, etc., having been designed for short rolling stock.

Combined Engines and Cars

The combined locomotive and passenger car has been found useful in districts where the traffic is too small to justify an ordinary train service. Most vehicles of this kind have a small steam engine and boiler at one end, driving the wheels immediately below. A boiler of the locomotive type is used in most cases. The cars are 40-75 ft. long and seat 40-75 passengers. Petrol-driven cars are in service on the N.E., London & N.W., and Midland G.W. (Ireland) Rlys., and the G.W., N.E., and G.C. have some in which power developed by a petrol motor is transmitted electrically to the driving wheels. In motor train sets an engine is attached to one or two carriages, or a couple of carriages may be placed on each side of it, and arrangements are made so that the actual driving can be effected from each end, a stoker attending to the engine. Thus the need is avoided of detaching the engine and shunting it to the head of the train at terminal stations.

ELECTRIC RAILWAYS. The working of rlys. by electric traction, in which the trains are driven by current conveyed through fixed conductors, placed beside or above the rails, to motors mounted either in the cars or in a separate locomotive, has made great strides within the last generation. The conditions which invite its adoption are found especially on urban and suburban lines, where the traffic is dense, the trains frequent, and the stations closely spaced. Owing to the fact that the electric

motor has much greater powers of acceleration than the steam locomotive, a higher average speed can be obtained, and thus the capacity of the line is increased. Another factor is that it increases the capacity of terminal stations.

The time and expense of shunting a locomotive from one end of a train to the other, or of providing a second one with the lines and sheds necessary for its accommodation, are saved, since an electric train, with its cars fitted with motors, can run in either direction and be driven from either end. Again, with rlys. in town areas that run wholly or partially in tunnel, electrification greatly simplifies the problem of ventilation. It is not, however, confined to suburban rlys., and many examples could be quoted of its application, accomplished or proposed, to main lines over long distances, especially in countries where fuel is scarce, but water-power is available for the generation of electricity. In England the N.E. Rly., which provided the first instance in the country of the working of mineral traffic by electricity (Newport-Shildon line, 1916), announced, in 1919, its intention of electrifying its main line between York and Newcastle.

Types of Current Employed

Both direct and alternating currents are employed for electric working. In Great Britain the former predominates, the only considerable example of alternating current (single phase) being provided by the system of the London, Brighton & S.C. Rly. In the earlier lines the direct-current voltage used was 600, but a pressure of 1,200 volts has been adopted on the Manchester-Bury section of the Lancashire & Yorkshire Rly., and 3,000 volts has been reached in America. A committee appointed by the ministry of transport has recommended (1920 and 1921) that 1,500 volts direct-current be the standard system for the United Kingdom, subject to the retention and, if thought advisable, the extension of existing voltages, and also to the adoption of multiples or sub-multiples of 1,500 volts.

TUBE RAILWAYS. London has a unique electric rly. system in its seven "Tube" rlys., so called because the tunnels are circular and lined throughout with iron segments bolted together to resist pressure of ground and exclude water. They were driven at a great depth in the clay (70-180 ft. below from the surface) to avoid interfering with existing sewers, water and gas mains, and tunnels; and in three cases they pass under

the Thames. Each track runs in its own tunnel, the two being abreast at the same level, except where the right of way overhead is too narrow to permit this.

Connexion with Termini

In some cases the stations are on summits approached by a rising gradient of 1 in 60, which slows the train automatically, and are left on a falling gradient of 1 in 30, which quickly accelerates the trains with very small consumption of current before the level stretch between gradients is reached. The various tubes communicate by subways with one another at crossing points, and with most of the great rly. terminals. At Paddington, Liverpool Street, Charing Cross, and other points passengers are moved to and from the tunnel stations by escalators or travelling staircases (see Escalator). The City & S. London line, the first tube rly. in London, was originally made with tunnels 10 ft. 2 ins. in diameter, afterwards enlarged to 11 ft. 8½ ins. diameter, while those of the Great Northern & City measure 16 ft. The other five lines have tunnels about 12 ft. across. At sharp curves the diameter is slightly increased to give clearance for the long bogie cars.

RACK RAILWAYS. On gradients exceeding 1 in 25 the ordinary kind of adhesion locomotive becomes impracticable. Gradients up to 1 in 12 can be climbed, under favourable conditions, by trains of which all the wheels are driven. On steeper grades adhesion is insufficient, and a positive means of haulage is required, the most usual being that afforded by the engagement of driven cogwheels with a rack laid between the running rails and fixed firmly to the sleepers. The steepest rack rly. yet built is that up Mt. Pilatus, with an average gradient of 1 in 2½ and a maximum gradient of 1 in 2. This, however, is an exceptional case, as 1 in 4 is considered the ordinary limit, above which cable haulage is to be preferred.

The racks used are of several kinds. The Strub is a single strong flat-footed rail with large teeth cut in the head; the Riggenbach has a single set of teeth shrouded on both sides; the Abt, two or more sets so arranged that the teeth are in different lines transversely. The last gives the smoothest running, as at least two rack teeth are always engaged with a driving cog. Various devices are employed to prevent the cogs climbing the teeth of a rack. On very steep gradients the locomotive is always placed on the downhill side of the vehicles it has to move. Brakes

act on the cog shafts, and come into action automatically if the speed exceeds a certain limit. Where electric power is available, it is now preferred to steam.

A notable rack rly. from Kleiné Scheidegg, in Switzerland, to the Jungfrau-joch is on a gradient of 1 in 4, and runs for most of its length in a tunnel cut through hard limestone, attaining a final elevation of 11,139 ft. The Nilghiri Hills line, in S. India, is a good example of a combined rack and adhesion rly. The locomotives have two cylinders to drive the adhesion wheels and two for the rack pinions.

LIGHT RAILWAYS. Many countries have encouraged the construction of secondary or light railways, to serve the needs of sparsely inhabited agricultural areas, and to act as feeders to the main trunk lines. In France, for example, there are the *Chemins de fer d'intérêt local*, and in Germany the *Kleinbahnen*, while in Belgium the *Société Nationale des Chemins de Fer Vicinaux* has, since 1885, done much for the development of transport in country districts.

These light railways are often, though not necessarily, of narrow gauge, and efforts are made to render them as cheap as possible both in first cost and in operation. Thus, to reduce the expense of the civil engineering works, steep gradients and sharp curves may be permitted, and sometimes the lines run along the public roads. The permanent way may be of comparatively rough construction, the rails light, the speeds limited, and the signals of the simplest kind, if not non-existent. The British Light Railway Act of 1896 sought also to save the high costs of promoting a bill in Parliament, by simplifying the procedure under which such lines were authorised.

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Railway Spine. Nervous disorder or neurosis which may follow any physical shock. It has been observed most frequently in rail-

way accidents, as in these the individual rarely gets any warning of the approaching shock. Sleeplessness, mental distress, pain in the back, paralysis of various limbs, and loss of control of the bladder may follow. The outlook for recovery is good, as the condition is hysterical in character.

Raimondi, MARC ANTONIO (c. 1475-1534). Italian engraver, also called Marcantonio. Born at



Marc Raimondi,
Italian engraver
After Raphael

Bologna, he studied under Francia and later under Raphael at Rome. While in Venice, 1508-10, he copied on copper many of Dürer's woodcuts, which he signed with the latter's mark; Dürer, however, obtained a prohibition against the continuance of this practice. Marcantonio's most famous plate is the engraving after Michael Angelo's *The Climbers*; he also engraved after Raphael, Giulio Romano, and Baccio Bandinelli. After the sack of Rome in 1527 he fled to Bologna, where it is presumed that he died.

Rain. Condensed water vapour of the atmosphere falling in drops. If a mass of air containing water vapour is cooled, some of the vapour may condense into tiny drops of moisture so light that the air can support them. In this manner fog, clouds, and mists are formed. If condensation proceeds further, the tiny drops amalgamate and form larger drops, which are too heavy to be held in suspension,

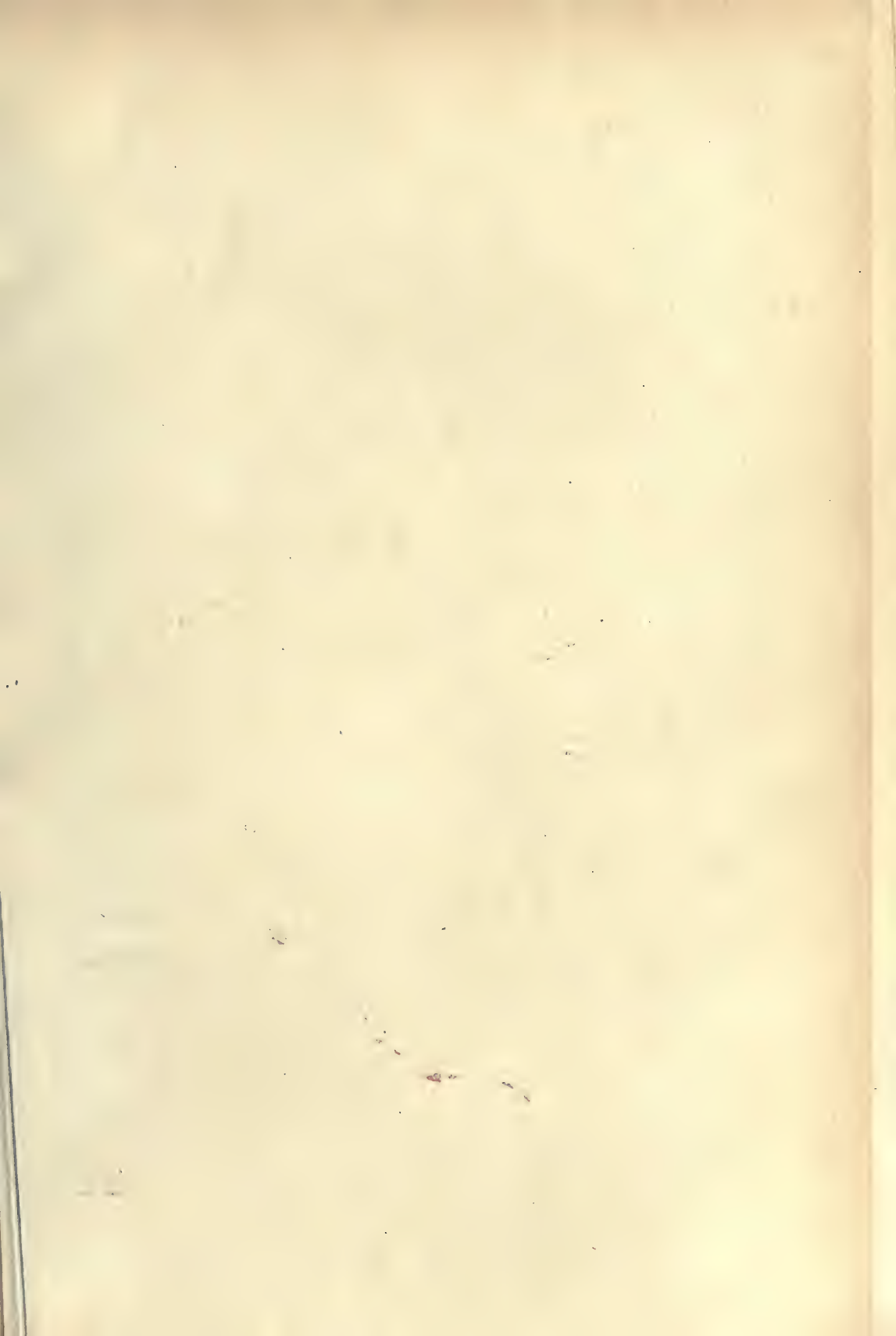
and a fall of rain ensues. See Humidity; Precipitation; Rainfall; Weather.

Rainbow. Name given to the phenomenon caused by the internal reflection and refraction of rays of light in the spherical globules of rain drops. A rainbow is always seen in the part of the sky away from the sun, its height varying inversely as that of the sun, i.e. the higher the position of the sun, the lower the rainbow. The colours of the rainbow are those of the spectrum in the same order, red being outside. Occasionally a second concentric and fainter bow is observed with the colours in the reverse order. The intensity of the colours of a rainbow depends largely on the size of the rain drops. On mountain tops, or from an aeroplane, completely circular rainbows may be seen under favourable conditions. Rainbows at night are usually precursors of fine weather the following day, and in the morning of wet weather during the day. See Clouds; Light; Spectroscopy.

Rainfall. General term used to signify the aqueous precipitation from the atmosphere, whether in the form of rain, hail, or snow. The study of rainfall is concerned with the reasons why precipitation occurs in particular areas, with the quantity which falls annually, and with the distribution from month to month, or from season to season. From the point of view of the observers, scattered throughout the world in many thousands, who measure rainfall daily, the subject is a branch of meteorology; from that of the scientist it pertains to climatology; while in relation to the control over human activities



Rainbow. Landscape painting by John Constable, showing Salisbury Cathedral in the arc of a rainbow







Rainfall. Map showing the distribution of the rainiest regions and the hot deserts of the world in relation to the season of maximum precipitation and the prevalent winds as indicated by arrows

exerted by varied types of precipitation it belongs to the science of geography.

Water vapour is always present in the atmosphere; warm air has a greater capacity for water vapour than cold air; it rains whenever warm wet air is sufficiently chilled, i.e. when the quantity of water vapour exceeds the capacity of the air at the lower temperature. The main factor in producing rainfall is loss of temperature. The air is warmest at its lowest levels, consequently rising air is chilled and is likely to deposit rain. Mountains and other elevated regions are rainier than the neighbouring lowland; the Pennines receive at least 10 ins. more rain a year than the valley of the Yorkshire Ouse; the wettest area in the world is on the Khasi Hills in Assam.

Very cold air, below freezing point, is, however, almost perfectly dry, and further cooling fails to produce a fall of snow. The rainless areas of the world are the deserts, both hot and cold. Over hot deserts, such as the Sahara, the air is so hot that it is never chilled below its capacity for water vapour. Over cold deserts the temperature is usually too low for the air to contain more than a very small quantity of water vapour. There are thus three rainfall belts in the world, one N. and one S. between the hot and the cold deserts and one equatorial between the hot deserts.

Rainfall is the complement of evaporation, which, in turn, de-

pends upon the oceans and the great seas. The complete cycle depends upon the carrying power of the winds to move the wet air from above the oceans landwards, and upon gravitation which forces the rain water oceanwards. Winds from the sea are carriers of water vapour, and, in general, coastlands are rainier than inland areas. Ireland is rainier than England, and England is rainier than Russia. Exceptions occur for two reasons; first, the winds may blow always from the coast seawards, and, secondly, the coastland may be so much warmer than the sea that the oceanic wind is not chilled, but warmed at the coast. In both these cases the coasts are almost rainless. S.W. Africa has a coastland of the first type, Sind in N.W. India of the second. Wet monsoon winds carry water vapour across Sind and the Thar desert, and loose the rain on the distant Himalayan slopes.

The Rainy Belts

Within the rainy belts, the quantity of rainfall depends upon the direction of the prevalent winds in relation to the lie of the coast, and the trend of the mountain ranges and hills. The W. Ghats are rainier than the Deccan, for the wet monsoon comes from the Arabian Sea; British Columbia is rainier than Alberta, since the prevalent westerlies cross British Columbia and the Rocky Mountains before they reach Alberta.

Moving air is more likely to be

chilled than comparatively still air, hence rain is frequently an accompaniment of storms and is characteristic of the left front of a cyclonic storm traversing the British Isles. Areas crossed by the regular storm tracks, such as Britain and Japan, are rainier than areas where storms are less frequent. In hot places such as tropical regions or inland lowland areas, such as Hungary or Manitoba, during the hottest summer weather it frequently rains about 3 p.m., when the day's heat is near the maximum; such rains are of short duration, but are heavy, and are often accompanied by thunder.

All these facts are summarised in a map of the world showing the annual precipitation by means of isohyets or lines indicating equal quantities of precipitation. From any area of great rainfall the quantity declines towards (i) the deserts; (ii) the lowlands; and (iii) places more remote from the ocean.

For practical purposes in relation to farming and water supply for human beings, or for stock, it is essential that the rainfall distribution through the year should be investigated. It is found, in general, that there are four types of distribution: summer rains, hot rainy summers and cool or cold dry winters; winter rains, hot dry summers and warm wet winters; constant rain or rain at all seasons, with but slight variation between the seasons; and no

rain or very slight precipitation at any season. Summer rains occur either on the equatorial edges of the hot deserts, as in the Sudan or Rhodesia, or in the interiors of continents, where the summers are hot and the winters too cold for any precipitation. Winter rains occur on the polar edges of the hot deserts, such as the Mediterranean region, S. California, the S. coast of Australia. Elsewhere the rain is at all seasons as in the equatorial regions, with two periods of slightly heavier rains than the average, or in the temperate regions such as Britain, which has a slight excess of rain in the late autumn, and a deficit in the spring.

Rainfall is intimately related to the main types of natural vegetation. Grass and scrublands are drier than forests. Grasslands are regions of summer rains. Winter rain regions have characteristic leathery-leaved trees, and usually no grass. Most hill and mountain slopes are forested. The study of rainfall acquires practical importance in relation to irrigation schemes, to the suitability of a district to a specific crop, and to the question of the provision of reservoirs for the water supply of a big city.

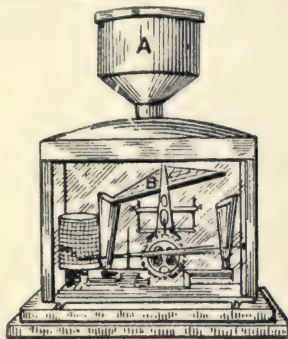
The Nile flood is due to summer rains on the Abyssinian mountains, the steady annual flow of Nile water is due to the rainfall at all seasons near the equatorial lakes, Victoria, etc.; these facts were determined before the great Nile dam was built. Areas suitable for growing cotton, tobacco, rice, and different types of wheat are largely determined by the character of the rainfall. A water conservancy scheme to supply London would involve calculations as to the minimum rainfall during the driest month, and the maximum during the wettest month in the catchment area of the proposed reservoir or reservoirs. See England; Meteorology; Precipitation; Weather; also colour plate, Rainfall.

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Rainford. Urban dist. of Lancashire, England. It is 4 m. from St. Helens and is served by

the L. & N. W. and L. & Y. Rlys. It is a rly. junction, and coal is mined in the neighbourhood. Pop. 3,500.

Rain Gauge. Instrument used for measuring the fall of water, whether in the form of rain, hail, or snow. A funnel, usually 5 ins. in diameter, catches the rain and leads it into some kind of vessel.



Rain Gauge. Instrument for measuring rainfall. A. Collecting funnel. B. Vessel which tips over when 0·1 in. of rain has fallen
Negrett & Zambra

At fixed times the precipitation is poured from this vessel into a measuring glass, which is graduated to read very small amounts. The graduations record inches or mm. of rain, and depend upon the capacity of the measuring glass in relation to the superficial area of the funnel in which the rain is caught. To get correct results it is important that the site of a rain gauge should be carefully selected. Many rain gauges are self-recording, emptying themselves automatically when full, and recording results on a roll of paper on a cylinder.

Rainier OR TACOMA. Quiescent volcano in Washington, U.S.A. It is situated in the Cascade Range, alt. 14,363 ft. Fourteen glaciers lie around its summit, and dense woods clothe its lower sides. Its crater emits fumes, but no recent eruption has occurred, and its eroded slopes indicate that there has been no eruption for a considerable period.

Rain-making. Production of rain by mechanical or other means. Among primitive peoples many usages and rites are practised for the purpose. They may be mimetic, as with the Australian Arunta group, in which members of the water-totem imitate a rising storm. In New Guinea, Africa, and America this is achieved by bull-roarers, which the Navaho make from lightning-riven pines, and the Zuni accompany by frothy decoctions simulating cloud. Many Amerind dances, especially in arid regions, such as the Hopi snake-dance, have a rain-making purpose.

In some African tribes—Bari and Dinka, for example—the rain-maker is the local chief, using magical stones and spears of traditional sanctity. Animal-sacrifice is observed by the Akikuyu with sheep and goats, and by the Buriat with horses. Some N. Indian forest-tribes immerse or sprinkle old people; in N. Africa a dressed-up ladle, ghanja, is carried in procession and sprinkled; the ceremonial immersion of saint-images survived into 19th century France. In Burma temporary pagodas were erected for rain-spirits in human form, and after prayer were thrown into the Irawadi.

In modern times attempts have been made to induce rain to fall, chiefly by firing guns. In 1921 Charles M. Hatfield conducted experiments, in which chemicals were used, near Medicine Hat, Alberta. The farmers were satisfied that these succeeded in producing rain.

Rainproof Cloth. Fabric rendered more or less impervious to rain without perceptibly affecting its appearance, and without filling up its pores with solid material. The effect is dependent upon a change of surface tension. The material is treated in a way which renders the adhesion between the fabric and the raindrop less than the cohesion between the parts of the drop. Processes for accomplishing this have been in operation for some thirty years, and silk, wool, and cotton cloths are all dealt with.

The methods most generally employed begin by divesting the fabric of any grease it may contain, and impregnating it with insoluble oxides of alumina. The cloth is then dried and treated with waxes, an infinitesimally fine film or smear of wax being applied either in a molten condition or by rubbing against a solid cake of wax. To secure the best results wax of high melting point should be used. Rainproofing has been done by impregnating the fabric with wax dissolved in petrol or tetrachloride of carbon. More objectionable means have been used, such as a mixture precipitation of lead salts and soap, a combination prejudicial to the health of the wearer, and of doubtful efficacy as a protection against wet. The treatment loses part of its virtue in time, but the rainproof property can be restored by garment dyers. In wear the cloths should be lined, as the internal friction of the body tends to bring the rain through the interstices. The most suitable goods for rainproofing are those of a close texture.



Rainford. Seal of urban district council

Rainy OR **RÉNÉ**. Lake on the borders of Canada and U.S.A. It lies 155 m. W. of Lake Superior, and is about 50 m. long by from 3 m. to 8 m. broad. The outflow from the lake is past Fort Frances by the Rainy river into the Lake of the Woods. The provision of a lock at Fort Frances would facilitate continuous steamer navigation from the head of Rainy Lake to Kenora. The U.S. frontier is along the river and the S. shore of the lake.

Rainy, ROBERT (1826-1906). Scottish divine. Born in Glasgow, Jan. 1, 1826, the son of a professor of medicine at Glasgow University, he was educated there. After training at New College, Edinburgh, he became a minister of the Free Church at Huntly in 1851, and in 1854 removed to one in Edinburgh. In 1862 he was chosen professor of church history at New College, and in 1874 he became its principal. He resigned in 1900, and died at Melbourne, Dec. 22, 1906. Rainy was long one of the leaders of his Church, and in later life its most prominent figure. He had a good deal to do with the union of the U.P. and Free Churches which became the United Free Church, of which body he was the first moderator. He wrote a number of books. See United Free Church; consult also Life, P. Carnegie Simpson, 1909.

Raisin (Fr. from Lat. *racemus*, a cluster of grapes). Dried grape. They are used as a dessert fruit and in the making of puddings, especially as a constituent of the Christmas plum pudding, the hard pips being extracted before use. Raisins are imported from France, Spain, Turkey (see Sultanas), and Asia Minor. The ordinary raisin is made by drying in an oven, but the better sort, such as Muscatel raisins,

are sun-dried, being left on the vine, the stem of the branch being half cut through and the leaves removed. See Australia; Grape.

Raisuli, AHMED BEN MOHAMMED (1875-1925). Moroccan bandit. Of noble birth, he alleged certain grievances against the sultan, and became chief of a robber gang who, in 1904, captured Ion Perdicaris, a U.S. citizen, holding him to ransom for £14,000, which the U.S. government was compelled to pay. In 1907 he kidnapped Kaid Maclean (*q.v.*), who was ransomed for £20,000, and a quantity of military stores, Raisuli being also made governor of the province of Fassi. His rule at this place was firm and beneficent, but he was constantly involved in trouble with his superiors. In 1920-21 the disturbances in the Spanish zone in Morocco were ascribed to his influence. His death was announced in April, 1925. See Morocco.

Rait, ROBERT SANGSTER (b. 1874). British historian. Born at Aberdeen, Feb. 10, 1874, he was educated at Aberdeen University and New College, Oxford, being fellow of the latter from 1899-1913. In 1913 he was made professor of Scottish history



Robert S. Rait,
British historian

and literature in Glasgow University, and Historiographer Royal for Scotland in 1918. During the Great War he served in government departments, and was made C.B.E. in 1918. Among his works are *Mary Queen of Scots*, 1899; *The Scottish Parliament*, 1901; *Scotland*, 1911; *History of Scotland*, 1914; *A History of England and Scotland to the Union of 1707*, 1920; and *Thoughts on the Union between England and Scotland* (with A. V. Dicey), 1920.

Raj. Hindu word meaning rule. The British raj in India means the British sovereignty. See India.

Raja. Indian title of honour meaning king. It is given to rulers and others and sometimes hereditarily by the British government to Hindus, as that of Nabob to Mahomedans. It is the usual title of Malay and Javanese princes. The feminine is ranees.



Ahmed Raisuli,
Moroccan bandit

Rajahmundry. Town of India, in Madras Presidency. It is situated at the head of the delta of the Godavari, 30 m. from the sea and 365 m. N.E. of Madras on the rly. between Madras and Calcutta. The town was granted to the French in 1753 and evacuated by them in 1758, when it became British. It is an important river-crossing for road and rly. at the head of the Godavari delta. Pilgrims from the neighbourhood go to Benares, and carry away a pot of Ganges water; on their return to the bathing ghat here they empty half the water into the Godavari and then fill up the pot from the river. Pop. 48,400.

Rajbansi (Hindustani, royal-born). Caste-name used by the hinduised Bengali-speaking section of the Koch people in N.E. India. Numbering (1911) 2,049,454, nine-tenths are in Bengal, the remainder in Assam and in Bihar and Orissa provs. Descendant from a Dravidian tribe in the Ganges basin at the Aryan immigration, they now claim Kshattriya ancestry, and imitate the Brahmanical rite in the marriage ceremony. See Koch.

Rajendralala Mitra (1824-91). Indian Orientalist. He was born in the neighbourhood of Calcutta, Feb. 15, 1824. In 1846 he was appointed librarian of the Asiatic Society of Bengal, of which he was vice-president, 1861-84, and then president till his death, July 26, 1891. He was made C.I.E. in 1878, and given the title of raja in 1888. One of the most profound Oriental scholars of modern times, his many works on historical, antiquarian, architectural, and religious subjects are of permanent importance. They include *The Antiquities of Orissa*, 2 vols., 1875 and 1880; *Bodhi Gaya*, 1878; and *Indo-Aryans*, 1881.

Rajkot. Native state and town of India, in Kathiawar, Bombay Province. Native food grains, sugar-cane, and cotton are grown. The town is a rly. junction on the line S.W. from Mehsana, Baroda. There is a college for the education of sons of Kathiawar chiefs. The political agent for Kathiawar resides here. Area, 282 sq. m. Pop., state, 50,600; town, 7,800.

Rajmahal. Town of Bihar and Orissa, in the Santal Parganas. It is situated on the Ganges, 65 m. N.W. of Murshedabad, and was formerly of considerable importance. The name means royal residence. The Rajmahal Hills form the extreme N.E. edge of the Deccan plateau; round them the Ganges bends towards the S. Pop. 5,400.

Rajpur. Town of Bengal, India, in the dist. of the 24 Parganas. It is situated 12 m. S.E. of Calcutta. Pop. 11,600.



Robert Rainy,
Scottish divine
Elliott & Fry

Rajput. Race of India. The Rajputs are found in the northern regions, and are politically predominant in Rajputana. They consider themselves members of the warrior caste, and are mostly Hindus. The name means king's son. See India.

Rajputana. Group of 21 native states of N.W. India bounded by Bombay, the Punjab, the United Provinces, and Central India. The Aravalli Mts. cross the state from N.E. to S.W.; the larger portion N.W. of the mts. is sandy and unfertile, and forms on the W. the desert of Thar; the smaller area S.E. of the mts. is more elevated, rainier, and more fertile, and is drained by the Chambal and its tributaries. In the N.W. the people are nomadic, with herds of cattle, sheep, and camels; in the S.E. millet, oil-seeds, wheat, and barley are grown. The Rajputs are Hindus who speak Rajasthani. Jaipur is the largest city. Ajmer-Merwara is a British province enclosed within the state. Jodhpur, Bikaner, Jaisalmer, Jaipur, and Udaipur are the largest states. Area, 128,987 sq. m. Pop. 9,857,000.



Rajputana. Map of the Indian state which includes a large portion of the great Indian desert

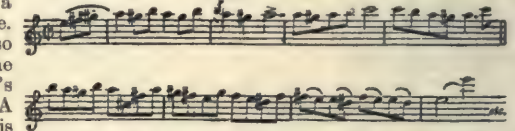
Rajshahi. Division and dist. of Bengal, India. The div. stretches from the Padma distributary of the Ganges, W. of the Brahmaputra, to the frontier of Bhutan. The dist. is bounded S. by the Padma. Rice is the main crop; jute is also grown. Hemp is produced under government supervision in a restricted area. The annual rainfall is 60 ins. Area, div., 19,235 sq. m.; dist., 2,618 sq. m. Pop., div., 10,138,000; dist., 1,481,000.

Rakahanga. Pacific island, a dependency of New Zealand. It lies 25 m. N. of Manihiki and 670

m. N. of Rarotonga. It is an atoll, but the lagoon has no pearl shells. Copra is produced. Pop. 400.

Rake. Implement used for heaping loose material together, for smoothing the ground in connexion with sowing, for pulling out weeds, and other special purposes. Essentially a rake is a toothed bar attached at right angles to a handle. The teeth, or tines, are of wood in a light hay-rake, long but also wooden in a caving rake, and of steel wire in a general purpose rake, while couch-rakes for weeding have curved iron teeth, and heel-rakes long curved steel teeth. For work on a large scale a horse-rake is used. See Agriculture; Hay.

Rake. Nautical term meaning inclination. Masts that incline forward are said to have a forward rake, those with a backward inclination have a backward rake. The term is also applied to the slope of a vessel's stem or stern. A raking fire is one directed at stern, whilst a dicate a fast



a ship's stem or rakish ship in-vessel having a smart appearance.

Rake. Term used for a man who lives a wild and dissolute life. It is derived from the phrase rake-hell, which was used of such in the 16th century. See Mohawk.

Rakoczy or **RAGOTSKY, GEORGE** (1591-1648). Prince of Transylvania. The son of Sigismund Rakoczy, a Hungarian magnate, he was elected prince of Transyl.

In 1643 he allied himself with the Swedes and the French, and roused Hungary against Austria with the intention of making himself king of Hungary.



George Rakoczy, Prince of Transylvania

reward for abandoning his pretensions, Rakoczy received the hereditary dignity of a prince of the empire and seven Hungarian counties. He died Oct. 24, 1648.

Rakoczy's son, George (1621-60), became prince of Transylvania. He fought against the Poles and was deposed, being killed whilst resisting the Turks. His only son, Francis (1645-76), was prince for a short time, and the latter's son, Francis (1676-1735), became, owing to his wealth and descent, the leader of the Magyars in their rising against the rule of the Hapsburgs. In 1704 he was chosen prince, but he was not strong enough to maintain his position, and his last years were passed in exile.

Rakoczy March. March for orchestra composed in Vienna by Hector Berlioz on a popular Hun-

garian theme. It was first performed at Pest with such tumultuous success that he had to bequeath the MS. to the city. Subsequently he incorporated it in his cantata *La Damnation de Faust*, 1846.

Raleigh. City of North Carolina, U.S.A., the state cap. and the co. seat of Wake co. It is 205 m. N.E. of Columbia, and is served by the Southern and other rlys. An important educational centre, it is the site of Shaw University, and contains the state college of agriculture and mechanical arts, and colleges for women and coloured students. Among the chief manufactured products are cotton goods, hosiery, cotton oil, agricultural implements, boilers, and stationery. Raleigh has been the state capital since 1792, the year of its foundation. It was named in honour of Sir Walter Raleigh. Pop. 24,400.

Raleigh Bay. Broad bay on the S.E. coast of North Carolina, U.S.A. Formed by long, narrow sand dunes, it reaches from Cape Hatteras on the E. to Cape Lookout on the W., and communicates with Pamlico Sound through Ocracoke Inlet.

Raleigh, CECIL. Pseudonym of Cecil Rowlands (1856-1914), British playwright. He went on the stage in 1880, was acting-manager of the Royalty Theatre and dramatic critic for *Vanity Fair* until 1897. He was best known as writer of *Drury Lane melodramas*, either in collaboration with R. C. Carton, Augustus Harris, Henry

Hamilton, and G. R. Sims, or alone, as in *The Sins of Society*, 1907; *The Whip*, 1909; and *Sealed Orders*, 1913. He died Nov. 10, 1914.

Raleigh OR **RALEIGH**, SIR **WALTER** (c. 1552-1618). English soldier, sailor, courtier, and writer. Son of Walter Raleigh, he was born at Hayes Barton, near Budleigh Salterton, south Devonshire, and educated at Oriel College, Oxford. After service with the Huguenots in France and the Netherlands, 1569-78, he went on a voyage of discovery with his half-brother, Sir Humphrey Gilbert, reaching the West Indies. He next took part in the suppression of Desmond's rebellion in Ireland, where later he was granted large tracts of confiscated land in Munster, acquired the famous house known as Myrtle Grove at Youghal, and built another house at Lismore. He appeared at the English court in 1581, and became a prime favourite with Elizabeth, who knighted him in 1584. For the story that he first gained the queen's favour by placing his cloak over a muddy pool in her path, there is no earlier authority than Fuller's *Worthies* of England, 1662.

In 1578 and 1583 Raleigh was associated with the unsuccessful attempts of Sir Humphrey Gilbert to plant a colony in N. America. Gilbert was lost at sea, 1583, and in 1584 Raleigh, though not permitted to go himself, fitted out an expedition which planted itself in what is now known as North Carolina, probably on the island of Roanoke. Raleigh named the colony Virginia, a name given for many years to the whole seaboard from Florida to Newfoundland. Other expeditions followed in successive years, one under Raleigh's cousin Sir Richard Grenville, and from Virginia tobacco and potatoes were first introduced into England and Ireland. The patent granted to Raleigh in 1584 lapsed to the crown in 1603, and the realization of his dream of a Greater England overseas was postponed until he was a prisoner in the Tower and the idea was taken up by others as a commercial enterprise.

Appointed vice-admiral of Devon and Cornwall, 1585, Raleigh helped to draw up a plan of defence against invasion in 1588, but it is doubtful if he took any personal part in the fight with the Spanish Armada. Meanwhile Essex, with whom he quarrelled, superseded him in the queen's favour, and he was committed to the Tower, July, 1592, for an intrigue with Elizabeth Throgmorton, one of the queen's maids of honour, his subsequent

marriage to whom caused him to be ostracised from court. M.P. for Michael, Cornwall, 1593, he made his famous voyage to the Orinoco in quest of El Eldorado in 1595, and in 1596, being restored to favour, he took a leading part, with Essex, in the Cadiz expedition, and distinguished himself at the Azores in 1597. M.P. for Dorset,



After Zuccherò

1597, and for Cornwall, 1601, in 1600-3 he was governor of Jersey.

On the accession of James I, 1603, when the air was thick with political intrigues, Raleigh was charged with plotting against the new king, and favouring the cause of Arabella Stuart. After a scandalously unfair trial he was found guilty and condemned to death. Reprieved on the scaffold, he was sent to the Bloody Tower, where, with his wife and son, he lived until Jan. 30, 1616, when he was released to lead another expedition to the Orinoco. As was inevitable, he came into collision with the Spaniards. The expedition left England in April, 1617. Raleigh returned June, 1618, and his punishment being demanded by the Spanish minister, he was arrested, and Bacon, then lord chancellor, acquiescing, he was arraigned on the old charge of treason, and executed in Old Palace Yard, Westminster, Oct. 29, 1618, his remains being interred in S. Margaret's (*q.v.*) The tercentenary of his death was celebrated in England and America in 1918.

Raleigh was the incarnation of the spirit of the Elizabethan era. As courtier, soldier, sailor, politician, poet, historian, chemist, he took rank among the foremost of his fellows. He was the pioneer of British colonial empire. A friend of Spenser, who called him Shepherd of the Ocean, and whom he visited at Kilcolman, he was also

a friend of Marlowe, and the foundation of the Mermaid Club (*q.v.*), in Friday Street, Chapside, is attributed to him. His works include *The Last Fight of the Revenge*, 1591; *The Discovery of Guiana*, 1596; *Relation of Cadiz Action*, first printed 1805; *History of the World* (to the second Macedonian War), 1614, in which he was assisted by Jonson and other scholars, a work written in the Tower, and ending with the celebrated apostrophe to death; *The Prerogative of Parliaments*, first published 1628; *The Cabinet Council*, pub. 1658; *A Discourse of War*; *Apology for the Voyage to Guiana*; and a number of poems, of which the most notable are *The Pilgrimage*; *The Lie*; *Reply to Marlowe's Come Live With Me and Be My Love*; and *A Poesy to prove Affection is Not Love*.

Bibliography. Works, 8 vols., with *Lives* by Oldys and Birch, 1829; *Poems*, with *Life* by Sir E. Brydges, 1813; *Poems*, ed. J. Hannah, 1892; *Lives*, E. Edwards, 1868; J. A. St. John, 1868; E. Gosse, 1886; M. A. S. Hume, 1897; W. Stebbing, new ed. 1899; J. R. Rodd, 1904; H. de Sélincourt, 1908; Sir W. Raleigh in Ireland, Sir J. Pope Hennessy, 1883; *State Trials*, ed. H. L. Stephen, 1899; *Great Englishmen of the 16th century*, Sir S. Lee, 1904; *Bibliography of Sir Walter Raleigh*, T. N. Brushfield, 1886, new ed. 1908.

Raleigh, SIR **WALTER** (1861-1922). British scholar. Son of a Congregational minister, A. Raleigh, he was educated at University College, London, and King's College, Cambridge. He became professor of modern literature at University College, Liverpool, and in 1890 of English literature at Glasgow. In 1904 Raleigh moved to Oxford as professor of English literature. He was knighted in 1911. Raleigh's writings include *The English Novel*, 1894; *Style*, 1897; *Romance*, 1917; and books on Stevenson, Milton, Wordsworth. He died, May 13, 1922.

Râles (Fr., rattlings). Sounds heard through the stethoscope, or on applying the ear to the chest, in certain diseases of the lungs or bronchi. *Pron.* rahl.

Rallentando. Musical term. Of Italian origin, it signifies gradually decreasing the speed of music, most frequently at the end of a piece or of an important section thereof, but also employed towards the close of a phrase and other places, cf. *Ritardando*.

Ralph Roister Doister. Early English comedy. Written by Nicholas Udall (*q.v.*), and first produced about 1551 at Westminster School, where it was revived in

Jan., 1921. Ralph Roister Doister is based on the Miles Gloriosus of Plautus. The plot concerns the unsuccessful wooing by the vainglorious Ralph of the wealthy widow Dame Christian Custance. Matthew Merygreeke, the fun-loving and good-natured friend of Ralph, is Udall's own creation. See Representative English Comedies, ed. C. M. Gayley, vol. i, 1903.

Ram. Usual name for the male of the sheep. The female is known as ewe. See Sheep.

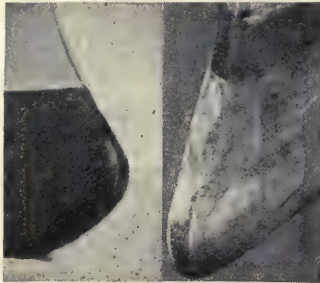
Ram. Projecting bow of a ship, used for sinking other vessels. Until the introduction of gunpowder it represented practically the only means of destroying an enemy ship, short of boarding and setting fire to it. In the galleys of the Greeks and Phoenicians, dating from about 700 B.C. onwards, the ram usually assumed the form of a trident, one spur projecting below the water-line and two above, and with the speed and handiness given by several banks of rowers the weapon became one of considerable power. The ram first appears in English history in the third Crusade. It dropped out of use as ships increased in size and solidity of construction, and disappeared with the sailing era.

When steam rendered ships again independent of the wind, and the substitution of iron and steel for wood made them more susceptible to serious damage below water, the ram returned to favour. It was used largely, but with relatively little effect, in the American Civil War; but the successful ramming of the Italian flagship *Re d'Italia* by the Austrian flagship *Ferdinand Max*, in the battle of Lissa, July 20, 1866, gave the ram a prestige which largely influenced naval construction for twenty years. It again fell into desuetude owing to the development of the torpedo and the quick-firing gun making it hazardous for a ship to approach bows-on upon another's broadside. Opinion was also influenced by three peace-time catastrophes, viz. the sinking of the British battleship *Vanguard* by the Iron Duke, Sept. 1, 1875; of the German battleship *Grosser Kurfürst* by the *König Wilhelm*, May 31, 1878; and of the British battleship *Victoria* by the *Camperdown*, June 22, 1893.

In the Great War the ramming manoeuvre was frequently and successfully employed against submarines, the first German boat sunk, the *U15*, having been destroyed by this means by the light

cruiser *Birmingham*, Aug. 9, 1914. Fast and handy craft, such as destroyers, are particularly suited for this work, and their multiplication was one of the principal anti-submarine measures adopted by the British admiralty. The largest vessel destroyed by deliberate ramming in the Great War, other than a submarine, was the German destroyer *G194*, cut in two by the light cruiser *Cleopatra*, March 25, 1916.

Ram. In engineering, a plunger driven out of a cylinder by water under great pressure to exert a strong squeezing or lifting force. A ram pump is one which raises water by means of the latter's own velocity. See Hydraulic Machinery; Pump.



Ram, as used in British naval construction; left, broadside view; right, end on

Ramabai, PANDITA (d. 1922). Indian reformer. Daughter of a Brahman, she travelled and studied in Great Britain and the U.S.A. She organized a home for high-caste widows at Poona and a settlement for orphans at Mukti. Her death was announced, April 15, 1922.

Ramadan. Ninth month of the Mahomedan year, May 9-June 9 of the Christian calendar. Sanctified as the month in which the Koran was revealed to the Prophet, it is kept as a strict fast, no food, smoking, or any form of self-gratification being permitted on any day between dawn and sunset. In addition there are many extra devotional practices, especially during the last ten days. In Ramadan the life of the Mahomedan world is carried on by night.

Ramadie. Town of Mesopotamia. On the Euphrates, it is 59½ m. W. by N. of Bagdad. The battle of Ramadie was fought between the British and the Turks, Sept. 28-29, 1917. On Sept. 26 General Maude concentrated a force for its capture. The place was strongly held by the Turks.

On Sept. 28 a flanking movement from the S. compelled the enemy to withdraw from the Mus-haid Ridge, 4m. from Ramadie, and,

screened by the ridge, cavalry crossed the Aziziyeh Canal, thence getting astride the Aleppo road to cut off the Turks' retreat. Infantry, including the Dorsets and the 5th Gurkhas, attacked and secured positions facing the enemy's main line.

By nightfall the Turks were hemmed in against the Euphrates. Early next morning they made a determined effort to break through the cavalry, but were driven back into Ramadie. The infantry attacked from the S.E. and S., the 39th Garhwalis seizing the bridge across the Aziziyeh Canal, and the 90th Punjabis pushing through the town and capturing Ahmed Bey, the Turkish commander. At 11 o'clock the whole Turkish force surrendered, the prisoners numbering 3,454 unwounded and 192 wounded men. The booty comprised 13 guns, 12 machine guns, two armed launches, and large quantities of supplies. See Mesopotamia, Conquest of.

Ramah. Name meaning a height, and used in the Bible for a number of places which are difficult to identify. One was the site of Rachel's tomb. The modern Er Ram (Ramah), E. of the Nablus road, and 6 m. N. of Jerusalem, was associated with the life of the prophet Samuel, and figured in the wars between the ten tribes and the tribe of Judah. It was captured by the British Dec. 28, 1917.

Ramayana. One of the two great epics of ancient India, Mahabharata being the other. Described as the Indian Odyssey, it tells of the wanderings and adventures of Rama, a prince banished from his country. The period, about 1000 B.C., is regarded as the Golden Age of India, the period of the Kosalas, to whom Rama belonged, and the Videhas, from whom came his devoted wife Sita. Rama and Sita are the Hindu ideals of perfect man and perfect woman. The poem, dating from some unknown time, and attributed to one Valmiki, has been added to again and again until it consists of 48,000 lines. An Italian edition and translation, 1843-67, first made it known to European readers. A large part of it was published in English verse by Ralph Griffith, 1868-74, and a prose translation has been issued at Calcutta. A condensed translation in verse is by Romesh Dutt, 1899. See The Indian Epics: Stories of the Ramayana and Mahabharata, J. C. Oman, new ed. 1899.

Rambaud, ALFRED NICOLAS (1842-1905). French historian and politician. Born at Besançon, July 2, 1842, he became professor of history at Caen, 1871, and at Nancy,

1875. In 1883 he was made professor of contemporary history at the Sorbonne, and was admitted to the Institut de France, 1897. Senator for Doubs, 1895-1902, he was minister of public instruction, 1896-98, and died in Paris, Nov. 10, 1905. His works include *L'Allemagne sous Napoléon I*, 1800-11, 1874; *La Russie Épique*, 1876; *Histoire de la Civilisation Française*, 1885-87; *Histoire de la Civilisation Contemporaine en France*, 1888; and a study of Jules Ferry, his old political chief, 1903. Rambaud was editor with E. Lavisse of the *Histoire Générale*, 1893-1901.

Rambler. Name given to a group of climbing roses. The crimson Rambler, a hybrid between *Rosa wichuraiana* and *R. multiflora*, was the first of the kind cultivated. Single and double varieties of many colours are now grown. They have dense clusters of small flowers and are good pergola plants. See Rose.

Rambler, THE. Periodical issued by Dr. Johnson during 1750-52. A series of moral and religious essays, although at times stilted in style and sentiment, they acquired great popularity, and were mainly responsible for Johnson's reputation among his contemporaries. Published by Cave, the Ramblers appeared every Tuesday and Saturday between March 20, 1750, and March 14, 1752. They were all written by Johnson except Nos. 10, Mrs. Chapone; 30, Miss Catherine Talbot; 97, Samuel Richardson; 44 and 100, Elizabeth Carter. See Johnson, Samuel.

Rambouillet, CHÂTEAU DE. Palace at Rambouillet, dept. of Seine-et-Oise, France. Now used as



Rambouillet, France. The Chateau, now the French president's country residence, from across the lake

the summer residence of the president of the French Republic, it lies 30 m. by rly. S.W. of Paris. The chateau has magnificent parks and gardens laid out by Lenôtre, and an interesting dairy built by Louis XVI. In the chateau Francis I died in 1547, and Charles X signed his abdication in 1830. It passed

into the possession of the nation at the Revolution.

Rambouillet, CATHERINE DE VIVONNE, MARQUISE DE (1588-1665). French lady. Born at Rome of an aristocratic Roman family, she married the marquis de Rambouillet in 1600, and, as mistress of the famous Hôtel Rambouillet, in the rue St. Thomas-du-Louvre, Paris, became from about 1608 onwards the centre of a social and intellectual circle unrivalled in its day. She died Dec. 2, 1665. Her daughter Julie (1607-71) married the duc de Montausier, 1645, and was also a woman of high intellectual attainments.

Rambutan (*Nephelium lappaceum*). Tree of the natural order Sapindaceae. It is a native of Malaya, and bears a bright red, oval fruit, closely related to the litchi nut. See Litchi.

R.A.M.C. Abbrev. for Royal Army Medical Corps (*q.v.*).

Rameau, JEAN PHILIPPE (1683-1764). French composer. Born at Dijon, Oct. 25, 1683, he became a



Jean Rameau, French composer

church organist in Lille and Clermont-Ferrand before settling in Paris in 1722. He attracted attention by his treatise on harmony issued in 1722, and in 1723 one of his lighter pieces was mounted at the Opéra Comique. His opera *Hippolyte et Aricie* was played at the Opéra, 1733, the first of a score, notable among which was *Castor et Pollux*, 1737. He published other important works on musical theory, *e.g.* his *Démonstration du Principe de l'Harmonie*, 1750. His harmonic theories, especially his ideas on chord-building by thirds and on the fundamental bass, profoundly influenced musical development in the 18th century. He died in Paris, Sept. 12, 1764. See LIVES, A. Pougin, 1876; L. Laloy, 1908.

Ramée, MADAME MARIE LOUISE DE LA. British novelist who used the pseudonym of Ouida (*q.v.*).

Rameses OR RAMESSU. Name of two Egyptian kings of the XIXth and of nine of the XXth dynasty. Rameses II, styled the Great, and long reputed to be the Pharaoh of the Oppression, reigned for 67 years from about 1300 B.C. He waged tedious wars against the Hittites, which resulted in his 21st year in a treaty preserved in a hieroglyphic version at Karnak, and in cuneiform on a tablet that was found at Boghazköi in 1907.

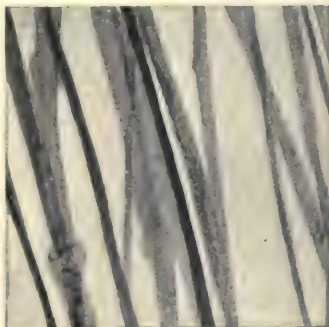
The greatest of Egyptian builders, one half of the temples still extant date from his reign, and his name or portrait occurs in nearly every great group of ruins. His finest statue is at Turin. Near the Theban Ramesseum are the remains of a statue estimated to have weighed 1,000 tons; the colossal head of another was removed to the British Museum. His mummy is at Cairo. See Abu-Simbel; Karnak; Luxor; Memphis; Pentaur; Sesostria.

Rameses III. King of Egypt. The Rhampsinitus of Herodotus, and the virtual founder of the XXth dynasty, he reigned for 32 years from about 1200 B.C. He undertook several defensive campaigns, used naval craft in the Mediterranean, and came into conflict with the Philistines. His majestic Theban temple at Medinet Habu, together with the great Harris papyrus in the British Museum—133 ft. in length, the longest known—record his military achievements and opulent temple-gifts. His tomb, 400 ft. long, discovered by James Bruce, contained a sarcophagus now in Paris, the lid being at Cambridge. His mummy is at Cairo.

Rameswaram. Town and island of Madras Presidency, India, in Ramnad dist. The island stretches S.E. towards Ceylon at the head of the Gulf of Manaar; from it Adam's Bridge (*q.v.*) reaches towards Ceylon. The rly. from Madura runs across the island through the town to the S.E. tip. Bêches de mer are obtained in neighbouring waters. In the town is a gate-tower temple with corridors 4,000 ft. long, visited annually by crowds of pilgrims. Pop. 10,600.



Rameses II. Head of the mummy of the Great Pharaoh
Cairo Museum



Ramie fibres, from which incandescent gas mantles are made

Magnified about 10 times

Ramie. Bast fibre of a stinging nettle, the *Boehmeria tenacissima* or *B. nivea*, also known as reha and China grass. The latter name is given to fibre hand-cleaned from the bark in China, and fine native cloth hand-made from long unspun fibres thus derived is sold as grass cloth. The fibre comes to Europe from China, Malaya, and India in the form of dried ribbons with the bark adherent, stripped from the stem and containing a strong insoluble gum or resin. This last having been decomposed, ramie can be carded or combed and spun upon worsted or flax machinery. The yarn has great tensile strength, but is so brittle as to snap easily at a knot. The fibre is heavy but very inflammable, does not contract when wetted, and is short of elasticity. Almost all incandescent gas mantles are made from ramie, as the ash of the fabric does not shrink like cotton upon burning. An artificial straw for hats is made by agglutinating parallel fibres into a ribbon. The fibre is extensively used in the making of cordage, nets, and in paper for banknotes.

Ramillies, BATTLE OF. British and Dutch victory over the French, May 23, 1706. The War of the Spanish Succession was raging, and, prevented by the Dutch from marching into Italy, Marlborough turned against the French, who had one army under Villeroi on the borders of the Netherlands, and behind it another under Marsin. These proposed to unite, but, before they had done so, Marlborough, having divined the plan, reached Ramillies, 12 m. N. of Namur, and offered battle. Villeroi did not wait for Marsin's main army.

The French army was arranged with the artillery in the centre, where was Ramillies, protected by infantry with cavalry on the wings. Marshy ground was on their left, where flowed the Little Gheet river, while their right was protected by two small villages which they held.

They were faced by the English and Dutch, infantry in the centre and cavalry on the flanks. The encounter opened with an attack by the English and Dutch on the French left, the troops wading rather than marching to the assault. Ramillies itself was also assailed, but in vain, and the reply was the rout of some Dutch cavalry. Further encounters between the horsemen, a contingent of Danes being on the English side, ended in the discomfiture of the French.

Meanwhile Marlborough had made movements that decided the day. Having assaulted Franquenay the Dutch infantry stormed Tavier, the other village held by the French, but the decisive stroke was effected when the English centre was strengthened. Charging forward, the infantry there broke through the French line about Ramillies. The Dutch had turned the right, so the enemy broke and fled. Nearly all the French artillery was captured, and they lost about 15,000 in killed, wounded, and prisoners. The losses of English and Dutch were under 4,000.

Ramleh. Town of Palestine. It is 22 m. W.N.W. of Jerusalem, and is situated on the main road from Jerusalem to Jaffa, with a branch to Ludd, and on the rly. from Jerusalem to Ludd and Jaffa. The chief mosque was originally a church built by the Crusaders. It was occupied by the British, Nov., 1917. Pop. 7,000.

Ramnad. Dist. and town of Madras Presidency, India. The dist. lies inland from Palk Bay and the Gulf of Manaar, and is drained by the Vaigai river, alongside which runs the rly. from Madura to Rameswaram Island. The chief crops are rice, native food grains, pulses, and cotton. The town contains the palace of the raja of Ramnad, who bears the title of Lord of the Bridge, i.e. Adam's Bridge. Area, 4,834 sq. m. Pop., dist., 1,658,000; town, 16,500.

Ramnagar. Town of the United Provinces, India, in Benares dist. It is situated on the right bank of the Ganges, almost opposite Benares. It contains the palace of the maharaja of Benares. Pop. 11,600.

Ramnicul-Sarat OR RIMNIC SARAT. Town of Rumania. It is on the Ramnicu river, 65 m. N.E. of Bukarest, on the main rly. from the capital, through Buzeu to Czernowitz (Cernauti). The town is the headquarters of a dist. of the same name, and is the seat of a bishop. In 1789 Russian forces defeated the Turks here. The battle fought here, Dec., 1916, between the Rumanians and Russians and the Germans, is

now usually known as Rimnic or Rimnic Sarat (q.v.). Pop. 13,000.

Ramón y Cajal, SANTIAGO (b. 1852). Spanish scientist. Graduating from Saragossa in 1873, eight years later he became professor of anatomy at Valencia, and in 1886 professor of histology at Barcelona. Transferring thence to Madrid in 1892, he earned a worldwide reputation by his researches, receiving half the Nobel prize for medicine in 1906. He wrote extensively in French and Spanish.

Ramoth-Gilead. Name signifying the heights of Gilead (q.v.), where Ahab was slain; also of one of the cities of refuge (q.v.).

Rampant. In heraldry, a four-footed beast or monster, represented as standing on its hind legs,



pawing the air, and with jaws open. It is then said to be rampant. But a horse in this position is often described as *forcené*, or *esfréné*, the nostrils being dilated, and the eyes of a different tincture from that of the body, and so said to be *animé*. See Heraldry.

Rampart. Wall of defence used either in permanent or in field fortification. Ancient and medieval forts had a wall of masonry strong enough to resist a battering ram for a long time, and broad enough to form a platform for the defenders, from which they could discharge their missiles. In field works a rampart is usually a bank of earth, sometimes supported by masonry, and protected in modern warfare by sandbags. See Castle; Fortification; Givet.

Rampion (*Campanula rapunculus*). Perennial herb of the natural order Campanulaceae. It



Rampion. Left, flower spray; right root and leaves

is a native of Europe, W. Siberia, and N. Africa. It has a thick, fleshy root. The lower leaves are

stalked and oval, the upper stalkless and very slender. The blue flowers are much like those of the harebell (*C. rotundifolia*), but form a many-flowered, long spray. The root is edible, and the plant is frequently cultivated for its sake.

Rampolla, MARIANO MARCHESE DEL TINDARO, CARDINAL (1843-1913). Italian statesman. Born at



Cardinal Rampolla,
Italian statesman

Polizzi, Sicily, Aug. 17, 1843, he was educated at the Collegio Capranica and the Accademia dei Nobili Ecclesiastici, Rome, and entered the diplomatic service of the Holy See. On his return from Madrid, 1877, he was made secretary of propaganda for Eastern affairs; in 1882 he again became nuncio at Madrid, and in the same year was created archbishop of Heraclea. Five years later Leo XIII gave him the red hat, and made him papal secretary of state. When, on the death of Leo XIII, 1903, Rampolla's election as his successor seemed certain, Austria exercised her veto, and Cardinal Sarto (Pius X) was elected. Rampolla thereupon resigned. He died at Rome, Dec. 16, 1913.

Rampur. Native state and town of the United Provinces, India. The state is situated adjacent to the Himalayan foothills, with Moradabad dist. on the W., and Bareilly dist. on the E. It is all that remains of the Rohilla Confederacy, and is surrounded by the districts of the Rohilkhand division. The town is on the rly. between Moradabad and Bareilly; it has manufactures of pottery and jewelry. Area 899 sq. m. Pop., state, 531,000; town, 72,200.

Rampur-Boalia. Town of Bengal, India, in Rajshahi dist. It is situated on the right bank of the Padma distributary of the Ganges, and is the dist. headquarters. It contains a college, and an old Dutch trading factory. Pop. 23,400.

Ramsay, ALLAN (1686-1758). Scottish poet. Born Oct. 15, 1686, at Leadhills, in Lanarkshire, he started his career as a wig maker. He collected and rewrote old Scottish songs and ballads, which were published in 1724 as *The Tea Table Miscellany* and *The Evergreen*. In 1725 he published *The Gentle Shepherd*, a pastoral containing admirable descriptions of rural scenery, and marked by genuine poetic feeling. In Edin-

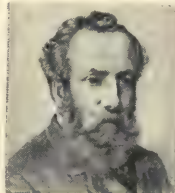


Allan Ramsay,
Scottish poet
After Aikman

died in Edinburgh, Jan. 7, 1758. Ramsay cannot be regarded as a great poet, and he has a strong vein of coarseness, yet he was a distinct factor in the return to Nature, which was to have such full expression a generation or two later. Both Burns and Scott found inspiration in Allan Ramsay's work. See *English Literature*; consult also Allan Ramsay, W. H. O. Smeaton, 1896.

Ramsay, ALLAN (1713-84). Scottish painter. Son of Allan Ramsay, the poet (*q.v.*), he was born in Edinburgh, and began his art studies in London in 1733. He went to Rome to study further in 1736, and returned to Edinburgh in 1739, when he received several portrait commissions of note. About 1757 he came to London, and soon established his reputation by his sound, if somewhat undistinguished, portraiture; among his sitters were George III and Queen Charlotte, Flora MacDonald, Lord Chesterfield, Hume, Gibbon, and Rousseau. A friend of Dr. Johnson, he was well known in intellectual society. He acquired a considerable fortune, spent some years in Italy, dying at Dover, Aug. 10, 1784. Examples of his work are in the National Portrait Galleries in London and Edinburgh.

Ramsay, SIR ANDREW CROMBIE (1814-91). British geologist. Born in Glasgow, Jan. 31, 1814, in 1841 he became assistant to the Geological Survey, in which service he rose steadily until he was appointed director-general in 1871, retiring in 1881. He was president of the Geological Society, 1862-64, and his most notable work was in connexion with glacial formations. He wrote *Old Glaciers of Switzerland* and *North Wales*, 1860, and *Physical Geology and Geography of Great Britain*, 6th ed. 1894. He died at Beaumaris, Dec. 9, 1891. See *Memoir*, Sir A. Geikie, 1895.



Sir Andrew Ramsay,
British geologist

burgh, in 1726, he opened a bookseller's shop which became a resort for many of the well-known literary figures of the Scottish capital, and the centre of a circulating library. He

Ramsay, EDWARD BANNERMAN BURNETT (1793-1872). Scottish author and divine. Born at Aber-



Edward Ramsay,
Scottish author

deen, Jan. 31, 1793, his father was Sir Alexander Ramsay, Bart. Educated at Durham and S. John's College, Cambridge, he was ordained in the Church of England, and 1816-24 was a curate in Somerset. In 1824 he obtained a living in Edinburgh, and in 1830 he was appointed incumbent of S. John's Church there. Ramsay was made dean of Edinburgh in 1846, and until his death was one of the leading figures in the episcopal church in Scotland. He died in Edinburgh, Dec. 27, 1872. Ramsay's fame rests chiefly upon his *Reminiscences of Scottish Life and Character*, 1858, a work which had its origin in two lectures delivered in Edinburgh in 1857. It is an admirable collection of Scottish stories, often typically humorous.

Ramsay, SIR WILLIAM (1852-1916). British chemist. Born in Glasgow, Oct. 2, 1852, and educated at Glasgow University, he afterwards took courses at the universities of Heidelberg under Bunsen, and Tübingen under Fittig. In 1880 he was appointed professor of chemistry at University College, Bristol, and became principal in 1881. He remained at Bristol until 1887, when he became professor of chemistry at University College, London, holding that post until his retirement in 1912. Knighted in 1902, in 1904 he received the Nobel Prize for Chemistry.

Ramsay's earliest work was on physical subjects, and his researches were directed into a chemical direction by a request from Lord Rayleigh that he would investigate the reason for the difference in the density of nitrogen prepared from the air and by chemical means. This research resulted in the discovery that the nitrogen from the air contains a new element, argon. Searching for other sources of argon, Ramsay discovered a new element, helium, in a mineral called cleveite, an element the existence of which had been detected by spectrum analysis in



William Ramsay
Lafayette

the sun. Later he discovered krypton, neon, and xenon, gases which occur in minute quantities in the air. After the discovery of radium by Curie (*q.v.*), Ramsay undertook a number of researches and estimated the molecular and atomic weights of radium emanation. In conjunction with F. Soddy he proved the transmutation of radium into helium. He died July 23, 1916.

Ramsay did good service to his country after the outbreak of the Great War, owing to his knowledge of Germany. As a memorial to him a fund was organized which provided research fellowships, and a laboratory of engineering chemistry at University College, London. He wrote *Gases of the Atmosphere: History of their Discovery*, 1896; *Modern Chemistry*, 1900; and *Elements and Electrons*, 1912. See *Radio-Activity*; consult also Sir W. Ramsay: *Memorials of His Life and Work*, Sir W. A. Tilden, 1918.

Ramsay, Sir William Mitchell (b. 1851). British archaeologist.

Born in Glasgow, March 15, 1851, and educated at Aberdeen, Oxford, and Göttingen, in 1880 he won a travelling studentship at Oxford, and subsequently spent many years in travel in Asia Minor. In 1882 he became fellow of Exeter College, and in 1885 of Lincoln College, Oxford, in the latter year being appointed professor of classical art in the university. In 1886 he was appointed professor of humanity at Aberdeen, which position he held till 1911. His leading works, based on his archaeological researches, include his *Historical Geography of Asia Minor*, 1890; *The Church in the Roman Empire*, 1893; *St. Paul the Traveller*, 1895; *Pictures of the Apostolic Church*, 1910; and *The First Christian Century*, 1911.

Ramsbottom. Urban dist. of Lancashire, England. It stands on the Irwell, 4 m. from Bury, with a station on the L. & Y. Rly. The industries include calico printing and bleaching; also the making of cotton and woollens; iron and brass founding. The works immortalised by Dickens in *Nicholas Nickleby* are said to have been at Ramsbottom. Market day, Sat. Pop. 15,100.



Ramsbottom arms

Ramscapelle. Village of Belgium, in the prov. of W. Flanders. It is on the Nieuport-Dixmude rly., 2 m. S. of the former place. It was prominent in the Great War in connexion with the fighting on the Yser. Captured by the Germans in Oct., 1914, it was quickly recovered by the French. Here, on Oct. 30-31, the French and Belgians, by flooding the district, defeated a determined German attempt to break through to the Channel ports. See *Ypres, Battles of*; *Yser*.

Ramsden, Jesse (1735-1800). British optician. Born at Halifax, Yorkshire, Oct. 6, 1735, he was apprenticed to a mathematical instrument maker in London, 1758. In 1762 he opened his own shop and turned his attention to optical instruments. In 1774 he brought out a new equatorial instrument. His invention for the accurate dividing of mathematical instruments appeared in 1777. Improvements in micrometers, sextants, theodolites, eye glasses, astronomical instruments, etc., followed in rapid succession, attesting to his inventive powers and mechanical skill. He died Nov. 5, 1800.

Ramsey. British armed boarding steamer of 1,443 tons. She was sunk in the North Sea, Aug. 8, 1915, by the German armed fleet auxiliary minelayer *Meteor*, 4 officers and 39 men being saved. Soon afterwards the captain of the *Meteor* abandoned his ship and blew her up to prevent her from being taken by a British squadron.

Ramsey. Market town and urban dist. of Huntingdonshire, England. It is 10 m. from Huntingdon, and is served by the G.E. & G.N. Rlys. There is an agricultural trade. The beautiful church of St. Thomas & Becket, partly Norman, has some valuable objects of interest. There are slight remains of the rich Benedictine abbey founded here about 970. The town has associations with the Cromwell family, to whom the abbey lands passed at the Reformation. Ramsey Mere, once a large lake in the fens, is now drained. Market day, Wed. Pop. 5,300.

Ramsey. Market town and seaport of the Isle of Man. It stands on Ramsey Bay, an opening of the N.E. coast, at the mouth of the river Sulby. It is 14 m. from Douglas, with which it is connected by rly. and

by electric tramway. An electric tramway runs from here to the top of Snaefell. A pleasure resort, the town has good sands, promenades, and a pier.



Ramsey arms

In N. Ramsey is Mooragh Park with a marine lake, and on Frissel Hill is the Albert Memorial Tower. There is a small museum. Ramsey existed in the 12th century, and has always been one of the most important places in the island. It has steamer connexion with ports in England. Market day, Sat. Pop. 4,700.

Ramsgate. Mun. borough, market town, seaport, and watering-place of Kent, England. It is on the eastern coast of Kent, in the Isle of Thanet, 74 m. from London, being served by the S.E. & C. Rly. Steamers go to and from London, and also to Boulogne and elsewhere.

Two stone piers enclose a fine harbour of refuge, which, dating from 1795, consists of an outer harbour of 42 acres, and an inner harbour.

With the exception of that of S. Lawrence, the chief churches are modern. Other buildings include the Jewish college, built by Sir Moses Montefiore. There is a Victoria pavilion, a pier, concert hall, theatre, an esplanade between the E. and W. cliffs, and a marine drive. Ellington Park is one of several open spaces. The industries include fishing and shipbuilding. Broadstairs lies to the N., and Pegwell Bay to the W., while electric tramways connect it also with Margate. In 1921 a residential area was being planned overlooking Pegwell Bay. During the Great War Ramsgate was bombarded from the sea, and was several times raided by aeroplanes,



Ramsgate arms



Ramsgate, Kent. Harbour and part of the sea front; in the foreground is the Pavilion
Frith

much damage being done. Ramsgate belonged for many years to the Cinque Port of Sandwich, and with a market and a pier was a place of some importance in the 17th century. In the 19th century it became a popular watering-place. In 1884 it was made a borough. Market days, Tues., Thurs., Sat. Pop. 30,000. See Frith, W. P.

Ramus, PETRUS OR PIERRE DE LA RAMÉE (1515-1572). French humanist, mathematician, and philosopher. Although his attacks on Aristotle made him unpopular, he was appointed professor of eloquence and philosophy at the College of France. He was assassinated during the massacre of St. Bartholomew. In supporting the claims of reason against dogma he anticipated the tendency of modern philosophy. See Ramus, *sa vie, ses écrits*, C. Waddington, 1855.

Ranavalona Manjaka III (1864-1917). Queen of Madagascar, 1883-96. After her accession, in accordance with the custom of the island, she married her prime minister, Rai nilaiarivony.

She led a mean and secluded life in her palace at Antananarivo, but made several efforts to assert her power against that of her consort. When Madagascar became a French colony, in 1896, she was dethroned and interned in Algeria. She died May 23, 1917.



Ranavalona, Queen of Madagascar

Rance. River of N. France, in the dept. of Côtes du Nord. It rises near the peak of Bel Air, and flows first E., and then N., to a long estuary at the mouth of which stands St. Malo. Small steamers ascend to Dinan; the picturesque lower course is canalised, and is connected by canal from Evran with the Vilaine at Rennes. Its length is 50 m.

Rancé, ARMAND JEAN LE BOUTHILLIER DE (1626-1700). Founder of the Reformed Trappist Order.



Armand de Rancé, Founder of the Trappists

He was born in Paris, and became a protégé of Cardinal Richelieu, who made him canon of Notre Dame and later prior of Boulogne. He was afterwards in high favour with Cardinal Mazarin, and spent his time at court till in 1662 he retired to the monastery of La Trappe in Normandy, where he reformed the order and instituted a severe régime of discipline. He was the author of various religious works, including an Explanation of the Rule of St. Benedict, and Moral Reflections on the Four Gospels. See Trappists; consult also L'Abbé de Rancé et Bossuet, M. L. Serant, 1904; La Vie de Rancé, F. R. de Chateaubriand, Introduction et Notes de J. Benda, 1920.

Ranch (Span. *ranch*, mess-room). Cattle farm on a large scale, for utilising the extensive natural pastures found in various parts of the world. The industry began with the Spanish settlers in the New World, and gradually spread into the prairie region of the U.S.A., and also into Canada. The *estancia* of S. America and the station of Australia and New Zealand are precisely the same thing. The improvement of stock has contributed greatly of late years to the success of the industry, and the raising of pedigree bulls for S. America has proved profitable to British breeders. The perfecting of methods of refrigeration has been a potent factor in development. See Argentina; Refrigeration.

Ranchi. Dist. and town of Chota Nagpur, Bihar and Orissa, India. The dist. adjoins the

Central Provinces. Paddy fields cover most of the tilled area.

The town is 2,169 ft. alt. and is the hot-weather capital of the province, the headquarters of a Church of England diocese, and a missionary centre. Area 7,104 sq. m. Pop., dist., 1,388,000, of whom 177,000 are Christians and 607,000 primitive animists; town, 33,000.

Rancidity. Condition which obtains in oils and fats upon keeping, characterised by a rank unpleasant taste and smell. The change is due to the formation of free fatty acids in the presence of moisture, the process being accelerated by enzymes or organic matter. The rancidity of butter is greatly assisted by the casein left in the fat. The change which takes place in olive oil results in the formation of oleic acid. If fats and oils are protected from light, air, and moisture, they retain indefinitely their state of neutrality.

Rand OR WITWATERSRAND. Gold-mining district in the Transvaal, British S. Africa. The ridge extends roughly E. and W. for some 40 m., and its reefs or mineralised beds of conglomerate (banket) consist of quartz pebbles cemented by gold-impregnated silica, iron oxides, etc., and contain, it is estimated, the largest reserve of auriferous ores in the world. Johannesburg is the centre of the goldfield, which was proclaimed in 1886. Gold had been found in the locality in 1854; 30 years later a small battery was erected, and quartz mining begun by the brothers Struben. The gold ores are low grade, and future success depends upon the facts that the reefs spread more or less horizontally, and that the extensive deposits of the E. Rand have yet to be developed. Deep mining is facilitated by the small rise in temperature which occurs as the mines become deeper, which is only 1° F. for 255 ft. It is not anticipated that the yield of over £38,000,000, obtained in 1916, will ever be surpassed. The Trans.



Rand. Map of the gold-mining district of the Transvaal, estimated to contain the greatest reserve of gold in the world; its total yield had amounted in 1921 to nearly £700,000,000

vaal produces annually about 40 p.c. of the gold mined in the world, and the Rand is responsible for more than 95 p.c. of this yield. See Chinese Labour; Gold; Johannesburg; Mining; South Africa; Transvaal; consult also Diamonds and Gold in South Africa, T. Reunert, 1893; Gold Mines of the Rand, F. H. Hatch and J. A. Chalmers, 1895; The Banket, R. B. Young, 1917. See N.V.

Randazzo. Town of Sicily, in the prov. of Catania. It stands on the N. slope of Mt. Etna, at an alt. of about 2,475 ft., 43 m. by circular rly. N.W. of Catania. The houses are mainly built of lava. The town is the nearest starting-place for the ascent of Mt. Etna. Pop. 14,000.

Randegger, ALBERTO (1832-1911). Anglo-Austrian composer and singer. Born at Trieste,

April 13, 1832, he studied composition under Lafont, worked at Fiume, Brescia, and Venice, and settled in London in 1854. He became professor of singing at the Royal Academy of Music, 1868, and at

the Royal College of Music, 1896, and conducted the Norwich Festivals from 1881. He conducted also at Her Majesty's Theatre and at Covent Garden Opera. His works include an opera, Bianca Capello, 1854; The Rival Beauties, a comic opera, 1864; a setting of the 150th Psalm, 1872; and the cantata Fridolin, 1873. He died Dec. 18, 1911.

Randegger, GIUSEPPE ALDO (b. 1874). American pianist. Born in Naples, Feb. 17, 1874, he was educated there, showing as a boy remarkable musical gifts. In 1893 he went to America as a teacher of music, settling eventually in New York. He composed a number of songs and pieces, and founded a society for the study of Italian music.

Randers. Town of Denmark, on the N.E. coast of Jutland. It stands at the mouth of the river Guden at the head of Randers Fiord, 22 m. N.N.W. of Aarhus. Its most prominent feature is a fine 14th century church. It exports corn, butter, eggs, wool, and fish. The manufactures include machinery, watches, gloves, and margarine. Pop. 24,000.

Randolph. Noted Scottish family, several of whom were earls of Moray. Thomas, the

1st earl, was a nephew of Robert Bruce. Captured by the English at Methven, 1306, he turned against Bruce, fought for the English, 1307-8, but was reconciled and created earl of Moray, 1308. In 1329 he became regent for David II and died at Musselburgh, July 20, 1332.

His eldest son, Thomas, was slain at Dupplin Moor three weeks later, and his second son, John, became 3rd earl. Made a prisoner in England, 1335-41, he was killed fighting at Neville's Cross, 1346. The earldom passed to his sister Agnes Dunbar (c. 1312-69), famed in Scottish history as Black Agnes.

Randolph, EDMUND JENNINGS (1753-1813). American statesman. Born at Williamsburg, Virginia,



Edmund Randolph, American statesman

Aug. 10, 1753, he was member of Congress, 1779-82, and governor of Virginia, 1786-88. At the Constitutional Convention of 1787 he proposed what is known as the Virginia plan, a scheme to establish two Houses on a population basis, and expressed himself strongly against a single executive. Although he refused to sign the final draft, he recommended Virginia to accept it rather than endanger the Union. While secretary of state, 1794-95, being suspected of attempting to obtain money from France as the price of stirring up ill-feeling against Great Britain, he resigned. He died in Clarke county, Virginia, Sept. 13, 1813. See his Vindication of Mr. Randolph's Resignation, 1795, and Omitted Chapters of History, M. D. Conway, 1888.

Randolph, JOHN (1773-1833). American statesman, generally known as Randolph of Roanoke. Born at Cawsons, Chesterfield co., Virginia, June 2, 1773, a descendant of Pocahontas (q.v.), he was four



Mr Randolph

After J. Wood

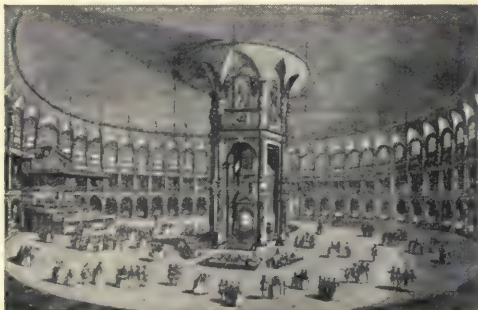
times Democratic member of Congress between 1799-1829, and senator, 1825-27, when he fought a duel with Henry Clay, whom he had insulted by calling him a blackleg. Personally disapproving of slavery, he gave his own slaves freedom by the terms of his will and left provision for their support. He died at Philadelphia, June 24, 1833. See Life, H. Adams, 1890.

Randolph, THOMAS (1605-34). English poet and dramatist. Born at Newnham-cum-Badley, near Daventry, Northants, and educated at Westminster, Oxford, and Cambridge, he was one of the most notable of the minor Elizabethan wits. His plays, which contain many allusions to contemporary life, include The Muses' Looking-Glass, a defence of the drama; Amyntas, a pastoral; and two comedies, The Jealous Lovers and Hey for Honesty. His best work was published posthumously. W. C. Hazlitt edited his works in 1875.



Thomas Randolph, English poet

Ranelagh. Former London place of amusement. At the E. of Chelsea Hospital, its gardens form part of the grounds of that institution. It was named after Richard Jones, 3rd viscount and 1st earl of Ranelagh, who built a house and laid out gardens here, 1690-91; and from 1742-1803 rivalled Vauxhall (q.v.). A notable feature was the Rotunda, a huge structure resembling the British Museum reading-room. Contemporary writers, Horace Walpole and others, bear witness to the popularity of the masquerades, concerts, and other entertainments of which Ranelagh was the centre. See The London Pleasure Gardens of the 18th Century, W. and A. E. Wroth, 1896.



Ranelagh. Interior of the Rotunda at breakfast time. At the base of the central pillar was a large fireplace

From a print of 1754

Ranelagh Club. London social and sporting club. Established in 1894, in Barn Elms Park, S.W., it provides facilities for polo, golf,



Ranelagh Club. The Club-house from the grounds

croquet, tennis, etc. Attached to the club-house is a building once known as Queen Elizabeth's Dairy. Here Jacob Tonson, founder of the Kit-Cat Club (*q.v.*), died in 1735. (See Barnes.)

The name Ranelagh is given in Paris to a grass plot and avenue near to the Porte de la Muette, once the site of a club founded in 1774, and notable for its fêtes.

Range (O. Fr. *renc*, rank). Word employed in various senses. 1. Primarily a series of things in a line, a continuous chain, *e.g.* a range of mountains. 2. In gunnery it is the horizontal distance to which a projectile can be thrown; and also the place where rifle or artillery practice is carried on. (See Range-finder; Rifle Range.) 3. In music, range is the compass of a voice or instrument. 4. The limits, geographical, or in point of time, within which an animal or plant is distributed, or has existed, on the globe. 5. A cooking stove built into a fireplace is known as a kitchen range. It is closed with iron plates and has one or more rows of openings on the top for carrying on several cooking operations at once. Fixed ranges may have one or two ovens. A boiler fitted at the back of the fireplace may supply hot water, and a tank, included with the boiler in a hot water circulating system, may provide water for domestic use. Modern ranges are usually portable.

Range-finder. Instrument used to ascertain the distance of the target from the firing point. Various types have been evolved to meet the different conditions experienced in warfare. The majority depend on the principle of measuring the angles of the triangle which is formed by making the target the apex and the instrument the base; and in order to simplify the measurements to be taken it is usual to arrange that one of the base angles is a right angle, leaving only one unknown angle to measure. The instrument is thus actually a goniometer (angle measure).

A simple instrument of this type was the mekometer (length measurer), used by British infantry, consisting of two reflectors joined together by a cord 25 or 50 yards long. One observer was at each instrument, these being so arranged that the one showed when the base made a right angle with the imaginary line to the target, and the other could then be sighted on the same object by adjusting a knob which carried a pointer moving over a dial graduated direct in yards instead of angles.

The vastly increased power of modern artillery, making it possible for guns to fire accurately to ranges of 20,000 yards, has natur-

ally demanded equivalent progress in the science of range-finding, and the instruments made by Barr and Stroud, and supplied to the British services, are outstanding examples of modern practice. In principle, these are also dependent on measuring the angles which two beams of light from the target make with the opposite ends of a known base line, and the latter is formed by a rigid metal tube having pentagonal reflecting

prisms fixed in each end. These prisms divert the beams of light along the axis of the tube, and through objective lenses also fixed near each end. At the centre of the tube other prisms divert the beams into a single eyepiece, and are so arranged that the beam of light from the right end forms the upper, and that from the left the lower, half of the field. It is thus obvious that the angles of the prisms must be varied to enable a continuous complete image to be obtained of targets at varying distances from the base.

In practice, especially at long ranges, if the base is made of any convenient length, the angular variations required of the prisms are so small that sufficiently accurate mechanical movement could not be arranged, and, further, the scale would be too fine to be read. These difficulties are obviated by interposing between one of the object glasses and the eyepiece a deflecting prism of small angularity, and definitely fixing the pentagonal prisms in the ends of the tube. By moving the deflecting prism along the optical axis the beam of light is diverted as if the angularity of the pentagonal prism were altered, but as the necessary lateral motion of the deflecting prism is considerable, an open and easily read scale can be provided, and the accuracy required



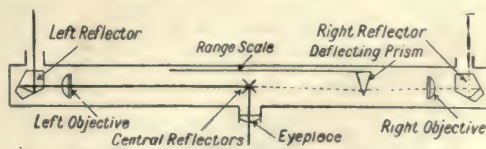
Range. Kitchen range with transparent oven door and many conveniences

By courtesy of Eagle Range & Grate Co.

ally demanded equivalent progress in the science of range-finding, and the instruments made by Barr and Stroud, and supplied to the British services, are outstanding examples of modern practice. In principle, these are also dependent on measuring the angles which two beams of light from the target make with the opposite ends of a known base line, and the latter is formed by a rigid metal tube having pentagonal reflecting

of the mechanical adjustment can be attained.

Suitable lenses are also provided for use when required, which distort a small object, such as a single light, into a vertical line, thus rendering it easy to see when the two half images coincide, and an optical system is also provided for checking the accuracy of the readings. The greater the length of the base, the more accurate are the determinations, especially at long ranges, and for naval and fortress use the instruments have a length between the pentagonal prisms of 9 to 35 feet, while portable range-finders



Range-finder. Diagram illustrating principles on which the Barr and Stroud instruments are constructed

for the infantry have a base of about 28 ins. For anti-aircraft work a Barr and Stroud instrument was devised on the same principle, giving simultaneous reading of the range and vertical height of the aeroplane. See Guns; Ordnance.

Ranger. In England, keeper of a royal forest or park. The office is now to a large extent a sinecure, but, strictly speaking, a ranger's duties consisted in walking through the forest, preventing and inquiring into trespasses, and recovering beasts of the forest that had strayed. Generally, a ranger is a wanderer, and the name is applied in the British army to the line regiment known as the Connaught Rangers. It was also a favourite name for sporting dogs. In the U.S.A. the ranger or warden patrols forest land, especially that owned by the state.

Rangoon. Capital of Burma (*q.v.*). It lies on the Rangoon river, here met by the Pegu and Pazundaung rivers, about 21 m. from its mouth. There is rly. connexion with Moulmein, Mandalay, Prome, and Bassein, and as a seaport Rangoon ranked fourth in exports during 1919-20 for British India. It is the main export centre of the great Burmese rice-fields, other exports including teak, raw cotton, petroleum, and hides. Imports are miscellaneous, including cotton, machinery, silk, and sugar.

To the W. of the picturesque Royal Lake lies the famous Shwe Dagon Pagoda, one of the greatest pilgrimage shrines of Buddhism, rising to a height of 370 ft. and magnificently gilded. Traditionally founded in 585 B.C., it has been little altered since the 16th century. The Sule Pagoda in the heart of the town is also notable. Modern buildings include House, Jubilee Hall, Anglican and R.C. cathedrals, and other features are the native bazaars, the lakes to the N. of the city, and the remains of the once important city of Syriam. In 1920 a bill was passed for the establishment of a university. Rangoon College and Collegiate School was founded in 1874.

In 1790 an East India Company factory was established in the small stockaded town. It was

held by the British from 1824-27, and was rebuilt on a new site by Konbaung Min in 1841. Its development since its capture by the British in 1852 has been rapid. Its pop. almost doubled between 1872-91, and in 1911 was 293,316.

Mysore. Silks and cottons are manufactured. Pop. 10,900.

Raniganj. Town of Bengal, India, in Burdwan dist. It is situated almost on the Bengal boundary on the trunk road and rly. from Calcutta to Benares.



Rangoon, Burma. Plan of the city and its environs

Rangpur. Dist. and town of Bengal, India, in the Rajshahi division. The dist. is adjacent to Assam and Cooch Behar, and is drained by the Tista tributary of the Brahmaputra. Tobacco is cultivated for trade and export. Jute is an important crop, and 60 p.c. of the area cultivated comprises paddy fields. The annual rainfall is 84 ins. The town is almost in the middle of the dist. Area 3,479 sq. m. Pop., dist., 2,385,000; town, 16,400.

Ranibennur. Town of Bombay Province, India, in Dharwar dist. It is situated in the S.E. of the dist. near the borders of Mysore and Madras Presidency, and is on the rly. from Bombay across

The Raniganj coalfield in the Damodar valley was opened more than a century ago, and has the second largest production in India.



Ranjit Singh,
Indian ruler

In the town are pottery works and a paper mill. Pop. 15,500.

Ranjit Singh, MAHARAJA (1780-1839). Indian ruler. Born Nov. 2, 1780,

in 1797 he assumed the chieftainship of the Sikhs, capturing Lahore in 1799, and Amritsar in 1802. Ambitious to found a Sikh empire, he aroused the suspicions of the British government which, in



Rangoon, Burma. The Shwe Dagon pagoda; left, entrance; right, the main building

1809, bound him by treaty to confine his authority to the N. of the Sutlej. Reorganizing his army with European officers, during the next 15 years Ranjit Singh extended his realm to include almost all the Punjab. He died June 27, 1839. See Life, Sir L. H. Griffin, 1892.

Ranjitsinhji, KUMAR SHRI (b. 1872). Indian prince and cricketer. Born at Sarodar, India, Sept. 10,



K. S. Ranjitsinhji,
Indian prince

1872, he was educated in India and at Trinity College, Cambridge. In England his wonderful powers as a cricketer soon attracted attention, and in 1895 he became a member of the Sussex county team. In 1896 and 1900 he was at the head of the English batting averages, and he played for Cambridge University and later for England against Australia. In 1906 he succeeded his cousin as maharaja of Nawanagar. He provided troops for the Empire in the Great War, himself serving at the front, 1914-15, and represented the ruling princes of India at the assembly of the League of Nations, Geneva, in Dec., 1920. Ranjitsinhji ranks as one of the greatest batsmen who ever lived. He wrote *The Jubilee Book of Cricket*, 1897.

Rank. Term designating the grade or dignity of a number of persons forming a certain class in organized societies. Ranks may be loosely differentiated without particular reference to function, as seen in the commonly accepted social distinctions, or formed with strict definition of status and authority, as in the ranks of ecclesiastical or military organizations. Equivalent ranks are recognized; thus, in the British naval, army, and air services, the rank of admiral of the fleet is equivalent to that of field-marshal or marshal of the air; captain, R.N., to colonel or group captain; chief gunner, etc., to second lieutenant or pilot officer. See *Caste*; *Nobility*; *Peerage*; *Precedence*.

Rank and File. Popular term for the British private soldier. The term, rank and file movement, is occasionally applied to the levelling influences which early in the 20th century tended to undermine the authority of the recognized leaders of the trade unions (*q.v.*). See *File*.

Ranke, LEOPOLD VON (1795-1886). German historian. Born Dec. 21, 1795, at Wiehe, in Thuringia, he was the son of a lawyer.

He was educated at schools in Saxony, and at the university of Leipzig, became a good classical scholar, and after leaving the university was for a time a teacher



Leopold von Ranke, German historian
After J. Schrader

at Frankfurt-on-Oder. There he wrote, in 1824, his first book, and on the strength of it was made professor extraordinary at Berlin.

After three busy years passed among the manuscripts in Berlin, Ranke went abroad to continue his studies. He was first in Vienna, and then for three years in Venice, Rome, and elsewhere in Italy, working hard on the historical documents there. He returned to Berlin, fully equipped for his life-work. In 1837 he became full professor at Berlin, and there he lectured and taught almost until his death. He was made historiographer of Prussia, and died May 23, 1886.

Ranke's works, as collected in 1881, fill 51 volumes. The greatest are probably his *History of the Popes*, and his *History of Germany during the Reformation*. His *History of England* deals chiefly with the 17th century, and is especially valuable for the relations between England and other European powers; like the *History of the Popes*, it has been translated into English. His *History of France* deals with approximately the same period. A work on the *History of Prussia* is also worthy of mention. When blind, and over

80 years of age, he began by the aid of secretaries to write the *History of the World*. He carried the story down to the Crusades.

Ranke was beyond comparison the greatest historian of his age, and one of the greatest of all time, for, save perhaps one, he had every quality that the perfect historian needs. His historical knowledge was enormous; no one ever moved with such ease over great tracts of human experience. Never a partisan, he sought only to reach the truth; he has indeed been accused of being too passionless. To this high quality his one defect is due; his style does not glow with eloquence, but is burdened with the direct commonplace of facts. It is, however, orderly, and not infrequently a pregnant aphorism is met. He taught his pupils to find the material of their work in nothing less than the original authorities themselves, to examine them critically, to consider the circumstances in which they were written, and the characters of their writers. See *History*; consult also *History and the Historians of the 19th Century*, G. P. Gooch, 1913.

Rankin, JEANETTE (b. 1880). American congresswoman. Born June 11, 1880, she associated herself with the feminist movement in the Western U.S.A., 1910-14, visiting New Zealand in 1915 to investigate social conditions. In 1917 she was the first woman to be elected to Congress.

Rannoch. Loch or lake of N.W. Perthshire, Scotland. It lies to the E. of the bleak moorland dist. of Rannoch. Surrounded by mountains, and a true rock basin, Loch Rannoch has a length of 9 m. and a breadth of 1 m. It contains two islands, receives the Erich, and is drained by the Tummel into the Tay.



Rannoch, Scotland. The highland loch, from Creaganour

Ranpur. Native state of Bihar and Orissa, India. It is the most southerly of the Orissa Feudatory States, on the borders of the Cuttack division. Its area is 203 sq. m. Pop. 46,000.

Ransom (Lat. *redemptio*). Money paid for the release of a prisoner. In medieval warfare it was usual for knights and others of high rank who were taken prisoners in battle to be ransomed, the money being in the nature of a prize for the victor. England paid a large sum for Richard I and France for King John. The practice prevailed until about 1800, when the method of exchanging officers according to rank was substituted. Ransoms were also paid to release captured ships and to save towns from being sacked. See Raisuli, Ahmed.

Ranters. Puritanical sect which flourished during the Commonwealth. Denying the Scripture and all outward manifestation of religion, they taught the presence of God in everything in nature, and were virtually pantheists. After the frenzy of the Commonwealth, the sect died out, but the name was revived about 1850, and given to the Primitive Methodists on account of the style of their denunciatory preaching.

Rantzau, COUNT ULRICH KARL CHRISTIAN VON. Name by which Count Brockdorff-Rantzau (*q.v.*) is more commonly known.

Ranula (Lat., little frog). Cystic swelling on the floor of the mouth due to obstruction and distension of the duct of one of the sublingual or salivary glands. The treatment consists in removing a part of the wall of the cyst, which then disappears. In some cases it is necessary to remove the whole cyst. The swelling is so named from its fancied resemblance to a frog.

Ranunculaceae or BUTTERCUP FAMILY. Large natural order of (mostly) herbs, natives of temperate and cold regions. Both leaves and flowers vary greatly in their forms in the numerous genera. The fruit is either a single-seeded nutlet (achene), a many-seeded bag (follicle), splitting along one side, or a berry. The juices of the plants are usually very acrid, and in many cases highly poisonous. Such well-known genera are included as clematis, anemone, helleborus, aquilegia, delphinium, and aconitum, as well as the typical genus ranunculus. See Anemone; Buttercup; Clematis; Hellebore, etc.

Ranunculus. Genus of annual and (mostly) perennial plants, of the natural order Ranunculaceae. The most popular wild member, the buttercup, is one of 28 natives of Britain. Others have been introduced into gardens from abroad at various dates since 1596. The old garden ranunculus (*R. asiaticus*) is tuber-rooted, and should be planted in February, in good loam, and well watered. The varieties

are innumerable, and the flowers of all shades and colours. The roots should be taken up annually in autumn, and stored in sand, in a cool place.

Ranz des Vaches (Swiss Fr., calling the cows). Melody played on the Alpen horn (*q.v.*). Its German name is Kuhreigen or cow-call. On account of its pastoral association composers have frequently introduced one of the many melodies into their works for the sake of local colour, as, for example, Rossini in his opera William Tell, and Beethoven in his Pastoral Symphony.

Rao, SIR DINKAR (1819-96). Indian statesman. Born Dec. 20, 1819, he became, after long and honourable service in Gwalior, prime minister of the state, and reduced its finances to order, establishing a sound government. Loyal to Britain during the Mutiny, despite the defection of all the troops, he held his office until 1859. His reputation was so high that in 1875 he was appointed one of the three Indian commissioners to try the gaekwar of Baroda, who was charged with an attempt to poison the British resident. Rao was a member of the legislative council, highly esteemed by all parties, and was made an hereditary raja. He died Jan. 9, 1896.

Rao, SIR MADHAVA (1829-91). Indian statesman. Born in Madras, he was early imbued with the advanced social and political ideas which he attempted to put into practice when he became prime minister of Travancore, 1857. Unable to awaken sympathy in the maharaja, he resigned and was later employed by the British government in reorganizing the state of Baroda. Retiring from public life in 1882, he devoted himself to sociology and literature, dying April 4, 1891.

Rap. Counterfeit Irish copper coin current in the time of George I. It passed as a halfpenny, though intrinsically it was worth only a quarter of its nominal value. Derived from the word rapparee, used of Irish armed freebooters, the word survives in the expression "not worth a rap," i.e. valueless.

Rapallo. Small seaport and favourite health resort of the Italian Riviera, in the prov. of Genoa. Sheltered by mountains, at the head of the Gulf of Rapallo, 16 m. by rly. E.S.E. of Genoa, it has a castle, now used as a prison, interesting churches, a zoological garden, and a Roman bridge. In the vicinity is a popular pilgrimage church. Lace and olive oil are the principal manufactures. Tunny fishing is an industry. Pop. 12,000.

Rapallo, TREATY OF. Treaty signed by Italy and Yugo-Slavia, Nov. 12, 1920. It settled various territorial disputes arising out of the Great War. By the pact of Rome, April 8, 1918, Italy recognized the unity and independence of the Yugo-Slav nation, and the freedom of the Adriatic, but when the latter, following the cessation of hostilities, occupied Carinthia, Italy demanded the annexation of Fiume and other places on the eastern Adriatic. (See Annunzio, Gabriele d'; Fiume.)

By the treaty the frontier between the two nations was fixed, and Italy renounced Dalmatia, but Zara, together with its commune, and several adjacent communes, were placed under Italian sovereignty. Both powers recognized the independence of Fiume, and former Austrian or Hungarian subjects within the territories placed under Yugo-Slavia were given the option of claiming Italian nationality within one year, and were exempted from transferring their domicile out of Yugo-Slavia should they do so. The treaty involved sacrifices for the latter, for by it 400,000 Slavs passed under Italian rule. Finally it settled the Adriatic question, giving Yugo-Slavia possessions on the coast. Both nations ratified the treaty early in 1921. See Italy; Yugo-Slavia.

Rape (Lat. *rapa* or *rapum*, turnip). Cruciferous forage crop which may either take the place of ordinary roots in a rotation or be grown as a catch crop, and is an excellent sheep feed. There are two kinds, the smooth-leaved summer rape (*Brassica campestris*) or dwarf, and the rough-leaved winter rape (*Brassica napus*) or giant. Swede and turnip are derived from these respectively, but have developed enormously thickened roots. The dwarf variety is suited to calcareous soils, and the giant to heavier kinds, especially those of the fen districts. The method of cultivation and manuring is the same as for turnip, and careful preparation of the seed-bed is necessary. The seed is either drilled (5 lb. per acre) or broadcasted (up to 10 lb. per acre). Giant rape is commonly sown in May or June, and is ready to be fed off in the autumn. As a catch crop for providing spring fodder it is put in during July or August. See Brassica; Turnip.

Rape (Lat. *rapere*, to seize). In English law, the carnal knowledge of a woman without her consent. Rape is not necessarily forcible. It may be committed by fraud, e.g. by personating a woman's husband. It is punishable by penal servitude for life or a less period,

but not less than three years; or by imprisonment with or without hard labour for a period not exceeding two years.

Rape. Division of the county of Sussex. It is the equivalent of the hundred in other counties. There are six rapes, Hastings, Pevensey, Lewes, Bramber, Arundel, and Chichester. The rapes are mentioned in Domesday Book. In early times each had its own lord and took its name from his castle. See Sussex.

Rape Cake. Artificial feeding-stuff made from rape seed after extraction of the oil. If pure, it is a valuable food for milch cows. Rape cake, ground into rape dust or meal, is also used as a manure, and gives good results with wheat, barley, roots, including potatoes, and hops.

Rape of Lucrece, THE. Poem by Shakespeare in seven-line stanzas, published 1594, and founded on the story, told in Ovid's *Fasti*, of the rape of Lucretia, the wife of Collatinus, by Sextus Tarquinius. She sends for her husband and father, and, calling upon them to revenge her, then kills herself. See Lucretia.

Rape of the Lock, THE. Mock-heroic poem by Alexander Pope. First published, anonymously and incompletely, in 1712, it was based on an incident which resulted in the estrangement of two families. Lord Petre had, in the summer of 1711, cut a lock of Arabella Fermor's hair, and it was suggested to Pope by a friend that he should try to effect a reconciliation. The result was *The Rape of the Lock*, of which James Russell Lowell has said that, taken in all, it is the most perfect poem in the language. It gives a wonderful impression of the social life of the time.

Raphael. In the O.T. Apocrypha, one of the seven angels which present the prayers of the saints and go in and out before the glory of the Holy One (Tobit xii. 15). He is represented as being sent to cure Tobit of blindness and to bind the evil spirit Asmodeus (*q.v.*). See Angel.

Raphael (1483-1520). Italian painter. Born at Urbino, April 6, 1483, his father was Giovanni Santi, a poet and painter, whose name latinised into Sanctius was in the son's italianised back into Sanzio. His early training was under Timoteo Viti, but when seventeen he went to Perugia, to work in the studio of Perugino, and from the elder artist derived a lasting impression. Later on, he was in Florence, where he made a particular study of the work in sculpture of Donatello and Michel-

angelo, and of the paintings of Leonardo. He also at that time became the intimate friend of the Dominican, Fra Bartolommeo. To this period of his career can be attributed his long series of paintings of the Madonna and Child, and his greater altarpieces. In 1508 he was in Rome, entrusted by Julius II with the decoration of certain rooms in the Vatican. It was then that he painted his great group of



From self-portrait
in the Uffizi
Gallery

Raphaello

the Greek Philosophers, generally known as the School of Athens.

In 1512, Leo X, who had succeeded Julius II, commissioned certain other frescoes, and the work was finished in 1514. One of the artist's most important portrait groups represented this pope with two cardinals. Raphael's designs for the tapestries of the Sistine Chapel were prepared in 1515, and seven of them constitute one of the great treasures of England, and can be inspected at the Victoria and Albert Museum.

Raphael's architectural work commenced in 1514, when he was appointed by Leo X to succeed Bramante as architect of S. Peter's. The position entailed great labour, and he added to it the preparation of a survey of Ancient Rome, cartoons for other frescoes in the Vatican, portraits of many notable persons, and a great picture of the Transfiguration, which he intended should be one of his noblest works. This picture he was never able to complete, only the upper portion of it was from his hand, and he died on Good Friday, April 6, 1520, of fever, which he is believed to have caught when inspecting an ancient monument in the neighbourhood of Rome.

His works are very numerous, and he also left behind him a vast store of sketches. He can best be studied in the Vatican, and in the galleries of Florence, Rome, London, Paris, Dresden, and Madrid. His most popular pictures are the wonderful Madonna de San Sisto, in Dresden; the Madonna della Sedia and the Madonna del Gran Duca in Florence; the St. George and the Dragon in Petrograd; the portraits in the Pitti Gallery in Florence; and the Ansidei Madonna in London. The last named was painted for the Ansidei family of Perugia, c. 1506, and bought in 1885 for the National Gallery, which contains, among other examples, a delicate instance of the master's early manner in the small *Vision of a Knight*. His earliest important work under the Perugino influence is the *Crucifixion in the Mond collection in London*. Raphael's Madonnas, notably the San Sisto at Dresden, are the greatest works of their kind the world has ever seen. No other artist ever painted such Divine tenderness in a woman's face or produced pictures which so fully "create a religious emotion."

Raphael is believed to have painted about two dozen portraits, but some are doubtful attributions, and some are no longer extant. His self-portrait in the Uffizi was probably painted at Urbino in 1506, and his beautiful portrait of an unknown lady in that gallery is of similar date. The impressive portrait of Pope Julius II, in the Pitti Gallery, with replica in the Uffizi, dates from 1511-12, and that of Baldassare Castiglione, in the Louvre, is a well-known portrait which later excited the admiration of Rembrandt and Rubens. His portraits are generally reckoned of secondary importance in his work, but in the best of these Raphael showed in a small compass the same mastery of drawing and power of conveying character as in his greater compositions. See Angel; Art; Galatea; Gregory VII; Halo; Horace; Jacob; Jesus Christ; Julius II; Madonna; Noah; Painting; etc.

G. C. Williamson

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Raphia Palm (*Raphia*). Small genus of trees of the natural order Palmae. They are natives of tropical Africa, Madagascar, and S. America. They have short trunks, but the leaves are frequently of enormous length, and the fact that they are erect causes them to appear much larger in proportion to palms with arching leaves. Those of *R. ruffia*, from the Mascarene Islands, are 50 or 60 ft. long, and of feather-form. The flower spikes also are large—six ft. long. Its fruits are as large as eggs of the domestic fowl, covered with smooth, hard, overlapping scales, and containing a single seed. The fruit-clusters weigh two or three hundred lb. *R. taedigera*, native of the Amazons, has leaves of similar length and seven or eight feet wide, whose leaf-stalks, 12 to 15 ft. long, serve many of the uses of bamboos, and cut into thin strips are plaited into baskets. *R. vinifera* (Wine palm), native of W. Africa and the Amazons, from the similar use made of its leaf-stalks, is known as the bamboo-palm. See Africa.

Raphoe. Market town of co. Donegal, Ireland. It is 15 m. from Londonderry. The chief building is the church, formerly a cathedral, dating in part from the 11th century, and there are remains of the bishop's palace. Woollens are manufactured, and in the neighbourhood are raths, mounds, and other antiquities. Raphoe grew up around a monastery, and was made the seat of a bishop in the 8th century. Until the 17th century there was a castle here, and in the time of Charles II a grammar school was founded. In 1835 the see was united with Londonderry. Market day, Sat. Pop. 2,600.

Rapids. Part of a stream's course where the current flows much more quickly than the average, making navigation almost impossible. Rapids are frequently caused by differences in the hardness of the rocks over which a stream flows. Soft layers are cut more rapidly than hard, so that rapids occur where the stream flows from hard to soft layers. See Portage.

Rapier (Fr. *rapière*). Light, slender sword of highly tempered steel used solely for thrusting. It is about three feet in length, and was a favourite weapon with duellists in the 16th and 17th centuries. The rapier was simplified and developed to its best in Italy, France, and Spain, and in the hands of a well-trained fencer became a most deadly weapon of offence. Its very lightness, backed by strong and supple wrist-play, proved effective against inferior



Raphia Palm. *R. taedigera*, the short-timbered variety found in the Amazons

opponents, while the guard remained impenetrable to the most determined attack. The successor to the rapier as a duelling weapon was the shorter small-sword of the 18th century. See Hilt.

Rapin de Thoyras, PAUL DE (1661–1725). French historian. Born at Castres, Tarn, March 25,



Rapin de Thoyras, French historian

1661, he was driven from France by the revocation of the edict of Nantes. He followed William III to England; distinguished himself as a soldier; and was afterwards tutor to the earl of Portland's son. In 1707 he settled at Wesel, and wrote his *Histoire d'Angleterre*, 1724, Eng. trans. 1757–63. He died May 16, 1725.

Rapisardi, MARIO (b. 1844). Italian poet. He was born at Catania, and published the first of his philosophical epics, *Palionigene*, at the age of twenty-four. In 1875 he published a volume of studies, *Catullo e Lesbia*, and in the same year became professor of Italian literature in the Catania university. His later works are *Lucifero*, 1877; a translation of *Lucretius*, 1880; *Giobbe*, 1884; *Atlantide*, 1889; and a translation of Shelley's *Prometheus Unbound*. His collected works appeared in 1894–97.

Rapp, JOHN GEORGE (1770–1847). Founder of the Harmonist sect. Born at Württemberg, Germany, from youthful days he was afflicted with visions in which he thought himself called to purify religion. With a few followers he went to America in 1803, and founded his Harmonist sect at Pittsburgh. He taught community of goods and wives, and gathered considerable wealth. After removing the concern to Indiana, he

sold it in 1823 to Robert Owen, and founded the colony of Economy near Pittsburg, where he died. See Harmonists.

Rapp, JEAN, COMTE DE (1771–1821). French soldier. Born at Colmar, Alsace, April 26, 1771, he distinguished himself in Egypt, in Italy, and at Austerlitz, and in recognition of the part he played at Aspern in 1809 was made a count. He also shared in the Russian campaign, and subsequently defended Danzig for nearly a year against the Russians. In 1814 he made his peace with the Bourbons, but he deserted to Napoleon in the Hundred Days' Campaign and was proscribed. In 1818 his status was restored to him by Louis XVIII. He died Nov. 8, 1821. He left some Memoirs, new ed. 1913.



Comte de Rapp, French soldier

Rappahannock. River of Virginia, U.S.A. Rising in the Blue Ridge, it follows a S.E. course to Chesapeake Bay, which it enters by a wide estuary. It receives the Rapidan, and is navigable to Fredericksburg, about 90 m. from the sea. Its length is 250 m.

Rapparee. Term derived from an Irish word for a pike. It was used for those irregular Irish troops who assisted James II in his struggle against William III. Afterwards it became a usual term for a robber.

Rappoltsweiler OR RIBEAUVILLE. Town of Alsace-Lorraine. It is picturesquely situated at the foot of the Vosges Mts., 33 m.



Rappoltsweiler, Alsace-Lorraine. Market place and gate tower

S.S.W. of Strasbourg. It produces excellent red and white wines, and its industries include textile manufacture, printing, and dyeing. There are a calcium-sulphate mineral spring recommended for gravel and similar disorders, and a carbon-dioxide spring bottled for use as table water.

The town is connected with the main rly. line by a normal gauge rly., 2½ m. long, laid on the high road. To the W. are the ruins of the castles of Hohrappolstein, Ulrichsburg, and Girsberg, formerly the seats of the lords of Rappoltstein. The chapel of the Jungfrau Maria von Dusenbach is dedicated to the patron saint of the Alsatian pipers and pilgrim minstrels. Above the town a barrier of unhewn stones, 8-10 ft. high, encircles the crest of the Vosges. Pop. 6,000.

Rare Earths. Name given to certain metallic oxides formerly regarded as elementary bodies, as yttria, erbia, ceria, lanthana, samaria, and didymia. They are conveniently classified according to the elements they yield: I. The yttrium group, consisting of dysprosium, erbium, holmium, terbium, thulium, yttrium, and ytterbium. II. The cerium group, consisting of cerium, decipium, europium, gadolinium, lanthanum, neodymium, praseodymium, samarium, and scandium. III. Thorium. IV. Zirconium. The oxides are known as rare earths because of the comparatively small quantities which are found in minerals.

The thorium salts are the most important, and are employed in the manufacture of incandescent gas mantles. The only known deposits of monazite sand of commercial importance are those worked on the coast of Brazil and in Travancore, India, the latter being the richest in thoria. Cerium and its compounds are used in medicine, also for making pyrophoric alloys, carbons for flaming arc lights, and for optical glass. Zirconium has been suggested for use as a refractory metal. See Element.

Rarotonga. Largest of the Cook Islands, in the Pacific Ocean. Of volcanic origin, it is the most fertile in the group. The mountainous interior, 3,000 ft., is forested, and a belt of alluvial soil, 1 to 3 m. wide, stretches inland from the coast. Avarua is the seat of administration. Pop. 3,000 natives and 160 whites.

Ras. In Arabic, geographical name used in the sense of "cape," as Ras-el-abyad, the white cape; Ras-el-kebir, the great promontory. The word also means "head" and "chief." It is specially applied to the chief minister of Abyssinia,

whose power was greater than that of the negus, the nominal ruler.

Raschette Furnace. Form of blast furnace largely used in Germany and in the United States in the smelting of lead and copper ores. It was invented by a Russian mining engineer, Wladimer Raschette, of St. Petersburg, in 1862, and first applied on a practical scale in the Upper Harz in Germany. Its distinguishing features are, a rectangular form in plan, a widening out of the body or shaft of the furnace from the hearth upwards, numerous tuyères for the introduction of air blast, arranged so that no one is directly opposite another, a melting zone or crucible constructed independently of the shaft, and the use of water jackets for preserving from injury those parts of the structure where the most intense heat occurs. The advantage of the rectangular cross section lies in the fact that it permits the capacity of the furnace to be greatly increased beyond what would be possible in a circular design. See Furnace; Smelting.

Raskolniki. Russian word meaning schismatics, used as a general term for all bodies which dissent from the Holy Orthodox Church. Such sects are somewhat numerous in Russia, most of them dating from the 17th and 18th centuries. Russian dissent is eminently conservative, and usually marks a resistance to some reform or change, often trivial, in the Orthodox Church. Thus sects have arisen over the question of how many times the Hallelujah was to be repeated in the service, or how many fingers should be used in making the sign of the Cross.

Rasp. Variety of file. In a rasp a series of burrs are made by a pointed punch to provide the filing surface. See File.

Raspail, François Vincent (1794-1878). French scientist and politician. Born at Carpentras,



François Raspail, French scientist

Jan. 25, 1794, he was educated for the Church, but refused to take orders. He studied and taught physics in Paris, and was active in advanced political circles, 1830, being president of the Amis du Peuple. Serving imprisonment after 1830, he worked on chemical research, publishing his *Système de Chimie Organique*,

1833. In 1848 he proclaimed the republic in Paris, was sentenced to five years' imprisonment, 1852, and then retired to Belgium. Returning in 1859, he sat as deputy for Lyons, 1869, and for Marseilles, 1876. He died at Arcueil, Seine, Jan. 7, 1878. His medical researches on antiseptics and the decay of tissues anticipated in some aspects the discoveries of Pasteur.

Raspberry (*Rubus idaeus*). Shrub of the natural order Rosaceae. Natives of Britain and other European countries, raspberries will thrive in any soil except clay, or one that has a clay subsoil. The canes should be planted in autumn or spring, at a distance of two ft. apart, and four ft. between the rows. As they require



Raspberry. Fruit and leaves of a cultivated cane: top, left, spray of flowers

some support, they thrive best if trained to wires stretched horizontally at intervals of 18 ins. above the ground.

After planting, the canes should be cut down to within six ins. of the ground, and a dressing of well-rotted manure applied to the surface of the earth as a mulch. Young canes are produced during the course of the year, but these should be limited to three or four from each parent plant. As fruit is borne only on one-year-old canes, the old wood should be cut away ruthlessly at the end of each season, and the young canes reduced to about one foot in height. The principal disease, raspberry spot, may be dealt with by spraying the canes with a weak solution of sulphate of copper, or Bordeaux mixture. Raspberries are shallow-rooting subjects, hence, in preparing ground for their reception, it is always advantageous to keep the best of the soil nearest to the surface. By way of summer stimulant superphosphate of lime or nitrate of soda may be applied, and liberal doses of liquid manure during the period of the ripening of the fruit. See Fruit Farming.

Rasputin, GREGORY (1873-1916). Russian fanatic. Generally called Rasputin, which means the immoral, his real name was Novikh, and he was born at Pokrovsky, Siberia, his father being a fisherman. He received no education, and only in his later years learned to write a scrawling hand. He began life as a fisherman, but soon showed himself a drunkard and a thief, and was punished for stealing. He acquired the epithet of "rasputin" because of his dissolute habits, and he adopted the name.



Gregory Rasputin,
Russian fanatic

When a very young man he became a professional pilgrim—he was never a monk—and, making some money, returned to his native village, but soon had to withdraw from the place. He resumed the rôle of professional pilgrim and actually acquired the reputation of a saint.

In 1905 he was the fashion as a "holy man" in Moscow, and among his devotees were many women, over whom he exercised a hypnotic power. In the same year he went to St. Petersburg, appeared as the creator of a new religious cult, and gained an influence at the Russian court, which was much increased by the tsarina's belief in his ability to cure and keep cured the tsarevitch, her ailing son. Gradually he acquired a commanding position among the reactionaries or "dark forces," and made and unmade ministers, while continuing his dissolute life. Banished to Siberia, on his denunciation by Milyukoff in the Duma in 1913, he returned to St. Petersburg soon after the outbreak of the Great War, was received with renewed favour by the tsarina, and again became a sinister political figure. On Dec. 29, 1916, he was assassinated in Petrograd by some highly placed Russians. He was plotting to bring about a German peace with Russia. See Rasputin and the Russian Court, C. Omessa, Eng. trans. 1918; Rasputin and Russia, V. E. Marsden, 1920.

Rassam, HORMUZD (1826-1910). Archaeologist. Born at Mosul, his father was a clergyman of the Chaldean Church. Having assisted Layard in his excavations, he studied at Magdalen College, Oxford, afterwards returning to his archaeological work, during which he discovered the palace of Ashurbanipal, at Nineveh. In 1854 he was



Hormuzd Rassam,
Archaeologist

worked for the British Museum, in Mesopotamia. Rassam died at Hove, Sept. 15, 1910. His works include Asshur and the land of Nimrod, 1897.

Rasselas. Philosophical tale by Samuel Johnson, published in 1759 with the full title of The History of Rasselas, Prince of Abyssinia. It consists mainly of musings and moralisings on human life, linked by the thread of story of Rasselas confined to the Happy Valley, of his attempts to leave it, and of his subsequent wanderings.

Rastatt OR RASTADT. Town of Baden, Germany. It stands on the Murg, 3 m. from its union with the Rhine, and 14 m. from Karlsruhe. The chief building is the palace, built on the model of the one at Versailles and formerly the residence of the margraves of Baden. A small place then, Rastatt was destroyed by the French in 1689, soon after which the margrave of Baden rebuilt and fortified it. It was, until 1871, one of the strongest fortresses between France and Germany. Pop. 15,000.

The peace of Rastatt was a preliminary to the treaty of Utrecht. Made between France and Austria in Nov., 1713, it put an end to the war of the Spanish Succession. In 1797 another peace conference was held here. This had no result, but was notable because two of the French envoys were murdered. The reasons for the crime are obscure. See Utrecht, Treaty of.

Rastrick. District of Yorkshire (W.R.), part of the borough of Brighouse. It stands on the Calder, 5 m. from Halifax.

Rat. Term applied to many rodents of the family Muridae, which includes the mice, rats, hamsters, voles,

made British resident at Aden, and in 1864 he was sent to Magdala, where King Theodore imprisoned him until released by Napier's expedition. Later, he

lemmings, and many others. The largest group of the rodents, it is world-wide in distribution. Nearly all the animals of this family have naked and scaly tails, narrow incisor teeth, not more than three pairs of cheek teeth in each jaw, and usually live in holes in the ground. The rats proper are found naturally only in the Eastern Hemisphere. Great Britain possesses two species, the black rat and the brown rat.

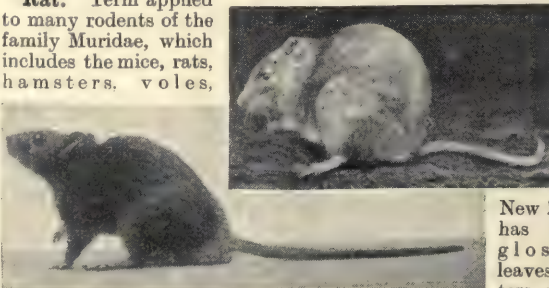
The black rat is shorter in body than the more familiar brown species, but has a longer tail. Its hair is greyish black on the upper parts and pale yellow below, while in certain of the Channel Islands a bluish variety occurs. The tame white and pie-bald rats, which have probably been bred in a domesticated state for at least two centuries, are said to be descended from this species. The brown rat is a native of Trans-Baikal, and migrated till it reached England about 1730. It is larger and more heavily built than the black rat, and is much more ferocious in disposition, and on reaching Great Britain soon exterminated the older species in most districts.

Rats prefer the neighbourhood of human dwellings and farms on account of the ease with which food may be obtained. They are omnivorous. They are amazingly prolific, several litters of from four to ten young ones being produced each year. Apart from the food they consume, rats do great damage by burrowing and by making holes in drain-pipes. The species of flea which infests rats is the vehicle of bubonic plague. The English board of agriculture devoted much energy towards exterminating rats in 1919-21, and various county councils throughout the country organized periodical campaigns, rewarding those who killed a specified number. A Rat and Mouse Act, 1921, placed on householders the onus of destroying rats and mice in their premises under penalty of a fine of £20. See Beaver Rat; Pouched Rat.

R a t a

(*Metrodierus robustus*) OR IRONWOOD. Tree of the natural order Myrtaceae, a native of

New Zealand. It has opposite, glossy, oval leaves, and clusters of bright red flowers. The hard, close-



Rat. Black rat and, above, the brown rat, two British species of the rodent

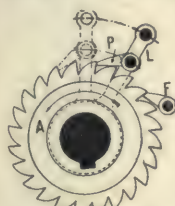
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grained wood, useful for shipbuilding, is used by the Maories for making boat-paddles and war-clubs.

Ratafia. Generic name for cordials or liqueurs made from, and flavoured with, cherries, almonds, apricots, peaches, nectarines, or plums. The crushed kernels as well as the flesh of the fruit are steeped in the spirit, which is afterwards distilled. *Pron.* ratafeea.

Ratan Tata Fund. Sum of money provided in 1912 by the Indian, Sir Ratan Tata. It was given to the university of London to promote the study and to further the knowledge of the principles and methods of preventing and relieving destitution and poverty.

Ratchet and Pawl. Device which permits one part of a machine to move another, if turned in one direction,



Ratchet and Pawl.
A. Ratchet wheel.
P. Pawl. L. Pawl
operating lever.
F. Fixed pawl or
catch

without affecting it if turned in the other direction. The ratchet, the part to which power is applied, is provided with teeth, perpendicular on one face, and usually sloping on the other. The pawl is a catch pivoted at one end to the lever, etc., through which power is applied, and suitably shaped at the other to engage the steep faces of the ratchet, against which it is pressed by its own weight, a spring, or some other device. A good example is found in the free-wheel of a bicycle. When dragged round by the chain in one direction the pawls engage with the ratchet teeth on the hub of the driving wheel. If turned in the other direction, or if the chain wheel is stationary while the driving wheel is running forward, the pawls merely click over the teeth. Another instance is the winding mechanism of a keyless watch.

Ratcliff Highway. Old name of St. George Street, Stepney, London, E. It runs E. from Upper East Smithfield to Shadwell High Street, N. of the London Docks. It was notorious in 1811 for a series of murders which threw London into a panic; they are referred to by De Quincey and Macaulay. Here Charles Jamrach (*q.v.*), founder of the firm of dealers in wild animals, set up in business about 1840. Near by is the church of S. George's-in-the-East, designed by Nicholas Hawksmoor, completed 1879, and standing in what is now a recreation-ground. In Princes Square



Rata or Ironwood. Flower cluster and leaves; inset, single flower, showing stamens

is the Swedish church, built 1728; in the adjacent Wellclose Square, the Seamen's day schools for children, on the site of a Danish church, 1696-1869.

Rate. Literally, a proportion, as in the phrase *pro rata*. In the United Kingdom the word has come to be the usual term for the money raised by local authorities, as distinct from taxes, which are raised by the central authority. Practically every elected local authority has the power to levy a rate, although it must do so on conditions laid down by Acts of Parliament. Rates are levied on property. Every building and all cultivated land is rated at a certain amount, called its rateable value, which is fixed at a certain sum, *e.g.* 8s. 9d. in the £. Agricultural land, under an Act of 1896, pays only on one-half of its rateable value. From time to time the assessments are revised; in London this takes place every five years.

In England the rates are paid by the occupier, whether owner or not, for although the owners of small houses usually pay them, they add the amount to the rent. In Scotland they are paid partly by owner and partly by occupier. The oldest rate is the poor rate, first imposed in 1597, and it still remains the foundation of the rating system. To other rates have been added for highways, education, free libraries, sanitary purposes, etc. It is usual for the collection of all rates to be entrusted to a single body which, having obtained from the other rating bodies particulars of what they want, levies a single rate. Thus an urban council will levy, in addition to its own rate, those re-

quired by the county council for education, police, and general purposes, and by the poor law authority. The term is used for the charges for water, but this is not, strictly speaking, a rate. In London there is a special equalisation rate. *See* Assessment; Borough; England; Local Government; Poor Law; Rent; Taxation.

Rateable Value. Amount at which houses and land are assessed to local rates, *i.e.* the yearly sum on which the rates are paid. It is usually something less than the rent, an allowance of one-sixth or thereabouts being made to cover the cost of repairs. The rateable value of a town must be ascertained before the amount required in the £ can be fixed.

Ratek. Chain of coral atolls in the Pacific Ocean. With the parallel chain of the Ralek atolls, it forms the Marshall Islands. Ratek is the eastern or sunrise chain, and the Ralek the westernly or sunset one. *See* Marshall Islands.

Ratel (*Mellivora*). Genus of carnivorous mammals, related to the badger, and found in India and S. Africa. Contrary to the usual rule of coloration, their upper parts are light grey and the under ones black. They have stout bodies and short legs and tail. They live in burrows, and feed by night upon small birds and mammals and honey.

Rath. Ancient Irish hill-fort. An earthen embankment, usually round, often stake-fenced, it protected, in the larger examples, the residence of a chief and his dependents. Nearly 30,000 remain, and the term enters into 700 place-names, as Rathlin, co. Antrim. Naas rath, co. Kildare, was the seat of the Leinster kings.

Rath OR RATHA. Hindustani name of several monolithic temples at Mahabalipur on the Coromandel coast, 30 m. S. of Madras. Carved out of granite boulders,



Ratel. Example of the burrowing carnivore, allied to the badger

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presumably in the 7th century A.D., and now deserted Hindu shrines, they are interesting as representing in miniature the Buddhist architecture of their time. *See* Mahabalipur.

Rathenau, EMIL (1838–1915). German capitalist. Born of Jewish parentage in Berlin, Dec. 11, 1838,



Emil Rathenau,
German capitalist

he was trained as an engineer at Hanover, Zürich, and elsewhere. After gaining further experience with an English firm, he returned to Berlin and started a foundry of his own. This was not a success, but after years of wandering over the world, in 1881 he took up Edison's incandescent lamp invention, and formed a company to work it in Germany; soon he did the same for the telephone, and in 1887 his firm became the General Electric Co. Kindred concerns were absorbed, and Rathenau supplied Berlin with electric light and various towns with tramways, he himself being engineer, merchant, manufacturer, and banker in one. He died June 20, 1915.

His son, Walter (1867–1922), succeeded his father as the head of the concern. After the changes of 1918 he became as prominent in politics as he was in business. In 1921 he was made minister of reconstruction, and later became foreign minister. A writer, one of his books dealing with industrialism was translated into English as *In Days to Come*, 1921. He was assassinated, June 25, 1922.

Rathenow. Town of Prussia, Germany. In the prov. of Brandenburg, it stands on the right bank of the Havel, 43 m. N.W. of Berlin. Its buildings include a Protestant church, dating from the 14th–16th centuries, and a R.C. one. There are manufactures of cloth, optical instruments, wood, and machinery. It became a town in 1295. The Swedes were defeated here by Frederick William of Brandenburg in 1675. Pop. 25,000.

Rathfarnham. Town of co. Dublin, Ireland. It stands on the Dodder, 3½ m. S. of Dublin. The chief industries are paper-making and corn-milling. There is a castle, built in the 16th century, and long the property of the Loftus family. Pop. 9,000.

Rathfriland. Market town of co. Down, Ireland. It is 10 m. N.E. of Newry. The chief building is the market house, and there are remains of a castle. Market day, Wed. Pop. 1,400.

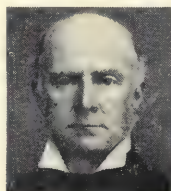
Rathkeale. Market town of co. Limerick, Ireland. It stands on the Deel, 19 m. from Limerick, with a

station on the G.S. & W. Rly. There are ruins of a priory founded in 1289, and near the town are those of a castle. Rathkeale was at one time a corporate town. Market day, Thurs. Pop. 1,700.

Rathlin OR RAGHERY. Island of Ireland. Off the N. coast of co. Antrim, it is 5 m. N. of Ballycastle. It measures 6 m. from E. to W., has a breadth of 1½ m., and reaches an alt. of 448 ft. S. Columba founded a church here in the 6th century, and Robert Bruce found refuge on the island in 1306; the remains of Bruce's Castle occupy an elevated position in the N.E. of Rathlin. Pop. 350.

Rathmines. Southern suburb of Dublin, Ireland. With a station on the Dublin & S.E. Rly., it occupies, in part, the site of the "Bloody Fields," the scene of the massacres of English colonists on Easter Monday, 1209. Limestone is quarried. Pop. (Rathmines and Rathgar, urban dist.) 38,000.

Rathmore, DAVID PLUNKET, BARON (1838–1919). Irish statesman. Born Dec. 3, 1838, the



Baron Rathmore,
Irish statesman

third son of the third, and the grandson of the first Baron Plunket (q.v.), he was educated at Trinity College, Dublin. Called to the Irish bar in 1862, in 1868 he was appointed law adviser to Dublin Castle. In 1870 he was elected M.P. for Dublin University.

Plunket became solicitor-general for Ireland, 1874–77, paymaster-general, 1880, and first commissioner of works, 1885. He was again commissioner of works 1886–92, and in 1895 he was raised to the peerage as Baron Rathmore of Shanganagh. He then turned his attention to railways, becoming director of the L.N.W., and chairman of the N.L. Ryds. A director of the Suez Canal Co., he also took part in founding the Central London Rly. He died Aug. 22, 1919.

Rathven. Coast parish and village of Banffshire, Scotland. It is 4 m. W.S.W. of Cullen, on the Highland Rly. The parish contains numerous antiquities, chiefly cairns and tumuli. Pop. (1921) 15,400.

Ratibor. Town of Silesia, Germany. It stands on the left bank of the Oder, 88 m. from Breslau. The buildings include a palace, formerly the residence of the dukes of Ratibor, modern law courts, and a Gothic church dating from the 15th century. An industrial centre on the Silesian coalfield, the town

has iron-foundries, railway shops, and manufactures of machinery. It became a town, 1217. Pop. 38,400.

The principality of Ratibor, of which Ratibor was the capital, was one of the little states of medieval Germany. Its area was about 400 sq. m., and it existed until 1532, when it became part of Austria. In 1745 it passed into the possession of Prussia. In 1821 a duchy of Ratibor was formed for the landgrave of Hesse-Rothenburg, and from him it passed to the family of Hohenlohe.

Rating. Name given in the British navy to anyone belonging to the lower deck. Sailors are rated as able seamen, petty officers, etc. Hence, obtaining promotion is commonly spoken of as picking up a rate. Rate as applied to a vessel means her classification.

Rationalism (Lat. *ratio*, reason). In philosophy, the theory that reason is the chief, if not the only, source of knowledge. It is opposed to empiricism (q.v.) and sensationalism (q.v.). According to the rationalist, reason is an original faculty which supplies us with concepts and first principles, different from the data of sense, which make it possible to go beyond sensible knowledge and attain the reality of things. While, however, some regard these concepts as innate in the mind, others regard them as immediately discerned by the mind, as intuitive principles.

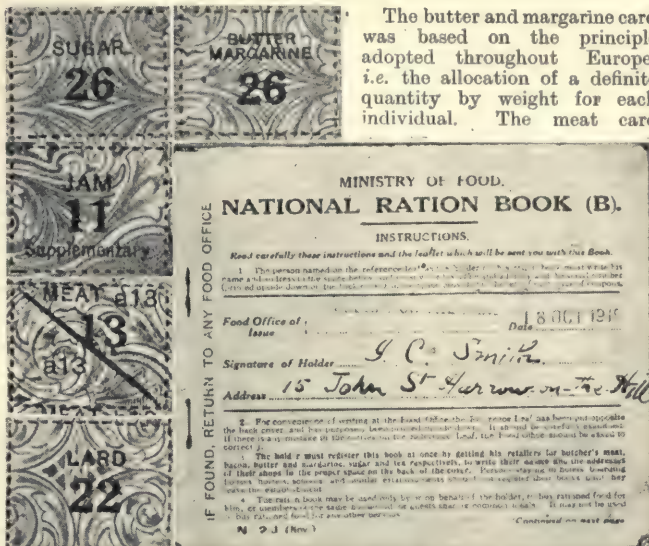
The rationalism of Kant, while asserting the existence of certain *a priori* (q.v.) principles due to reason alone, at the same time admits that reason can know nothing without the aid of experience, beyond the limits of which it can never go. Herbert Spencer, while granting that certain notions, such as space and time, are *a priori* as far as the individual is concerned, considers them to be in reality the result of cumulative experience. In theology, rationalism, as opposed to supernaturalism, is the system which interprets all religious belief and dogma in the light of reason, rejecting the authority of tradition and revelation. This line of thought, first systematised by Spinoza, came into special prominence during the struggle between deism and orthodoxy, between the supporters of natural and supernatural religion in the 18th century. See Free-thought; consult also History of English Rationalism in the Nineteenth Century, A. W. Benn, 1906; History of the Rise and Influence of Rationalism in Europe, W. E. H. Lecky, new ed. 1910; History of Freedom of Thought, J. B. Bury, 1913; Biographical Dict. of Modern Rationalists, J. McCabe, 1921.

Ration Book. Book issued in Great Britain under the Rationing Order, 1918. The books had to be registered for the purchase of sugar, fats, butcher's meat, and bacon, and detachable counterfoils or coupons of various colours were provided for successive weeks. They could be used only by or on behalf of the holder to provide rationed food for himself or for members of the same household. In the event of the death of the holder the book had to be given up to the registrar of deaths. Special ration books were issued for sailors and soldiers on leave.

A second ration book was issued towards the end of 1918 with extra spaces for extended use. These, however, were not required for long, as when food supplies began to come in freely, rationing became something of a dead letter, though it was not finally abolished for all articles until the end of 1919. See Bread Ticket.

Rationing. The Central Empires were compelled to adopt a system of rationing food at an early period of the Great War, and the advantages and errors of that system were already apparent when the menace of food queues in British towns towards the end of 1917 made it necessary to consider the rationing of the population of Great Britain.

The first food to be rationed was sugar. This was carried out in



Ration Book. Reduced facsimile of cover of 2nd ration book containing coupons which were given to tradesmen on purchase of goods

1917 by the issue of sugar cards from London, entitling each individual to purchase a certain quantity of sugar per week from a retailer selected by the purchaser. The quantity might be varied as circumstances dictated. This centralized method involved an elaborate system for the notification of removals, etc., and would have been difficult to apply if it had become necessary to ration all the staple foods.

As evidence of shortage of other foods in various localities became apparent, the local authorities were permitted to develop local card systems, and even to move supplies from one shop to another if queues developed. It was found that a very small deficiency caused exaggerated alarm, and led to long queues and to hoarding in a small way. When the consumption of imported meat, of margarine, and other articles by the army and navy made a real inequality between supply and normal demand, it was decided to institute a national system for the rationing of these articles, and to make it sufficiently elastic to cover bacon, lard, tea, cheese, and other commodities in case of need. Although uniform methods were laid down, administration—i.e. the issue of cards, the registration of customers, and to some extent the supervision of supplies—was left to the local authority acting through a local food committee. Individual customers had to be registered with particular retailers and each retailer supplied with his quota of food.

The butter and margarine card was based on the principle adopted throughout Europe, i.e. the allocation of a definite quantity by weight for each individual. The meat card

was on a new and ingenious system, framed to meet the case of a commodity varying in value and demand according to the portion of the carcass sold. The coupon represented not a fixed quantity, but a money value, and the prices shown on the schedule hung in butchers' shops showed prices fixed as closely as possible in accord with the food value.

The registration system involved reorganization of the trade in the rationed article in order to secure that each retailer might be supplied with the quantities required to meet the demands of his registered customers. No system of ration cards can be successful without a corresponding organization of supply and distribution at all stages. It was necessary to have control at each point, while the maintenance of a reasonable reserve was highly desirable.

Before any system of individual rationing was attempted it had been necessary to regulate supplies and prevent the competition bound to arise as soon as any signs of shortage were evident. Importers, wholesalers, and retailers of the principal foods were registered, each being allowed to dispose of a certain percentage of the supplies he had held in 1916. The retailer was "tied" to his wholesaler, and the wholesaler to his importer. But in munition and other centres changes of population made it essential to modify this system. In the case of margarine, the consumption of which was enormously increased,

No. G 677501 MINISTRY OF FOOD.
SUGAR
REGISTRATION CARD.

I desire to purchase my supplies of Sugar for my household from:—
A. Retailer's Name *J. L. Smith* *62 1/2*
Address *Cadbury Hall*
I hereby declare that no other Sugar Registration Card has been signed on behalf of my household.
B. Signature *Arthur Smith*
Address *70 Bunting Road* *18 24*
Date *20th Sept 1917*
No. of persons *4* Initials *AS*
District *...*

MINISTRY OF FOOD.
No. G 677501 SUGAR
REGISTRATION CARD.

C. Name *Griffiths Arthur*
Address *70 Bunting Road* *18 24*
Retailer with whom the Householder has registered—
D. Signature of *J. L. Smith* *62 1/2*
Retailer *Cadbury Hall*
Address *Cadbury Hall*
No. of persons *4* Initials *AS*
District *...*

Rationing. Reduced facsimile of sugar card and counterfoil of 1917



Ratisbon, Bavaria. West front of the 13th century cathedral

a system of distribution was set up for this purpose with a clearing house in London.

Meat supplied from local markets, as well as from imported supplies, presented a very difficult problem. Eventually the country was divided into areas, each covering a group of counties, rationed according to home-killed supplies and surpluses in the meat-producing counties transferred to industrial centres. Local divisions in an area were again rationed, and the butchers formed local committees to apportion the meat allotted to their town or district. Rationing in this case involved an extremely complex and a complete reorganization of the trade, including official supervision of markets and of slaughter-houses. Rationing, on the whole, made for equality and contentment. See Food Control.

Rations. Term employed to designate the official food supply for the personnel of the army. The main ration in the British army consists of the following daily quantities per man: $1\frac{1}{4}$ lb. of

fresh or 1 lb. of preserved or salt meat, $1\frac{1}{4}$ lb. of bread or 1 lb. of biscuit or flour, $\frac{1}{4}$ lb. of fresh vegetables or $\frac{1}{4}$ lb. of preserved fruit, $\frac{1}{4}$ lb. jam, 2 oz. sugar, $\frac{1}{2}$ oz. tea and various condiments. Alternative diets are stipulated in the case of troops serving in India, or countries where the climatic conditions make it desirable for different foods to be supplied. At the discretion of the general officer in command, troops on active service may also be supplied with a rum ration of $\frac{1}{2}$ gill per man per day and 2 oz. of tobacco per man per week. In addition to this normal supply every man in the field is provided with an iron ration.

In the navy rations are termed "victuals," and are on a similar scale to those for the army. The larger ships are provided with suitable storage for fresh meat and vegetables for long cruises. See Field Kitchen; Food; Iron Ration; Victualling.

Ratisbon OR REGENSBURG. City of Bavaria, Germany. It stands at the junction of the Danube and the Regen, 85 m. from Munich. A river port, it is connected with the

Main by the Ludwig Canal, and is the capital of the Upper Palatinate. The chief building is the cathedral, largely a 13th century edifice, but with chapels of earlier date and towers completed in the 19th century. It contains some fine works of art. Other churches are those of S. James and S. Ulrich. The church, which has a detached belfry, and the cloisters remain of the abbey of S. Emmeran. There is a town hall dating from the 14th century, a number of fine old houses, including the Golden Cross Inn, in the crooked streets, and, more modern, a palace built by the king of Bavaria, a public library, and a picture gallery.

The industries include a trade along the river and the manufacture of iron and steel goods, pottery, etc. The town proper is on the right bank of the Danube, but there is a suburb on the left bank; a medieval bridge connects the two. Owing to its position, Ratisbon was an important Roman settlement and later a Frankish centre, being the capital of Louis the German. An abbey was founded here and it was made a bishopric. In the 13th century it became a free city and was soon one of the richest trading cities in Germany. The emperors held several diets here, and in 1663 it was made the regular meeting place of the diet. Pop. 53,000.

Ratitae OR CURSORES (Lat. *raties*, raft; *currere*, to run). Division of the zoological class Aves. It includes a number of flightless birds, such as the ostrich, rhea, emu, cassowary, and apteryx. These all lack the keel on the breast-bone to which the flight muscles are attached in the flying birds.

Ratlam. Native state and town of Central India. The state is adjacent to Rajputana in the plateau division of the agency, and is drained by the Mahi river. Its area is 643 sq. m. Pop. 75,000. The town is a noted opium market, 48 m. W.N.W. of Ujjain, and is a rly. junction for Baroda, Indore, Agra, and Ajmer. Pop. 28,000.

Ratnagiri. Dist. and town of India, in the southern div., Bombay Province. The dist. lies along the Arabian Sea, and is comprised mainly of the steep slopes of the W. Ghats. It is without rlys., but is traversed by a N.-S. road. The annual rainfall is 97 ins. Rice is the chief crop. The town is on the coast, almost midway between Goa and Bombay city, and has a very exposed harbour. Sardine fishing is carried on during the early months of the year. Area, 3,989 sq. m. Pop., dist., 1,204,000; town, 15,900.

Rattan (*Calamus rotang*). Reed-like climbing plant of the natural order Palmae. A native of India, it has large, arching, feather-like, com-



Rattan. Foliage and fruit; single fruit shown in inset

pound leaves, three or four ft. long. The stems of this, *C. viminalis*, and several other species furnish the "canes" of commerce, used for walking-sticks and basket-work, and, when cut into thin strips, for the seats of cane-bottomed chairs. The stems are only an inch or two in thickness.

Rattan Palm (*Rhapis flabelliformis*) OR GROUND RATTAN. Dwarf palm of the natural order Palmae. It is a native of China and Japan. The stems are only about a foot and a half high, growing in dense tufts, rough with the decayed bases of former leaf-stalks. The leaves, which have long slender stalks, are divided into five to seven spreading leaflets.

Rattazzi, URBANO (1808-73). Italian statesman. Born at Alessandria, June 29, 1808, he became a lawyer, and in 1848 was elected to the parliament of Piedmont, and almost immediately entered the cabinet. A supporter of the war



against Austria, the defeat at Novara in 1849 drove him from office. In 1853, however, he joined Cavour's cabinet as minister of justice, and that of La Marmora, in 1859, as minister of the interior. Disgusted at the cession of Nice and Savoy to France, he resigned in 1860. In 1862 and 1867 he was prime minister for a few months, but on each occasion his opposition to Garibaldi's attempts against Rome, at Aspromonte and Mentana, led to his defeat. He died at Frosinone, June 5, 1873.

Rattle. Instrument which makes a rattling noise. There are various kinds, from the toy of

ivory or basket work given to babies, to that once used as an alarm by watchmen, and later by the police. This has a vibrating tongue fixed in a frame, which slips over the teeth of a ratchet wheel when whirled round, making a loud noise. See Africa.

Rattles. Name applied to plants of three distinct genera—*Rhinanthus*, *Bartsia*, and *Pedicularis*. It belongs properly to *Rhinanthus crista-galli* (yellow rattle), an annual herb of the natural order Scrophulariaceae, native of Europe, N. Asia, and N. Africa. It is parasitic on roots, and has lance-shaped



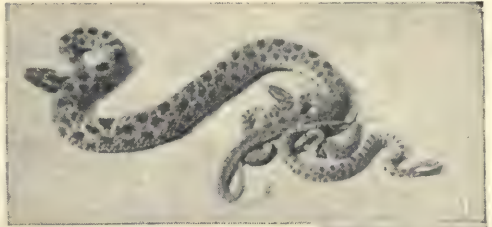
Rattan Palm. Head with flower sprays and leaves

round-toothed leaves, and yellow flowers. The inflated calyx remains when the contained seed-capsule is ripe, and, if the plant is brushed against, the seeds make a rattling noise.

Rattlesnake (*Crotalus*). Genus of venomous snakes. It includes about 16 species, all natives of America, mostly of N. America. Like the vipers, to which they are allied, they possess fangs, certain teeth in the front of the upper jaw so rolled upon themselves as to provide a groove down which the poison flows into their wounded victim. In most species the coloration is of a protective character, and their movements when hunting are stealthy. Apparently opposed



Rattle, formerly used as an alarm by police and watchmen



to this retiring disposition is the possession of the characteristic "rattle" terminating the tail, whose action warns prey of their presence.

This consists of a series of horny cups loosely, though securely, articulated, so that vibration of the tail by shaking them



Rattlesnake. 1. Pygmy rattlesnake with young. 2. Rattle of *Crotalus durissus*. 3. Texas rattlesnake coiled, with rattle lifted

W. S. Berridge, F.Z.S.

produces the rattling sound, for which various purposes have been suggested. One of its uses—as a sexual call—appears to have been verified, and answering rattles have been heard; but when the snake is hunting it is silent. The best known species are *Crotalus durissus*, of N. America, and *C. horridus* of S. America. An alternative name for the genus is Pit-vipers, suggested by a hollow between nose and eye due to the formation of the jaw-bone (maxilla). See Reptile; Snake.

Rattray. Police burgh of Perthshire, Scotland. It stands on the Erich, opposite Blairgowrie, 9 m. from Dunkeld. There are mills for flax-spinning, and near the town are traces of a castle. Pop. 1,700.

Rauch, CHRISTIAN DANIEL (1777-1857). German sculptor. Born at Arolsen in Waldeck, he studied sculpture under Valentin and Ruhl while valet to the duke of Waldeck. Later, after entering the household

of Frederick William III at Berlin, he was enabled to go to Rome. His greatest work was the monu-



Christian Rauch.
German sculptor.
After A. Henning

ment of Frederick the Great at Berlin, unveiled 1851. One may cite also the mausoleum of Queen Louise at Charlottenberg, the Dürer monument at Nuremberg, and statues of the Tsar Alexander, Blücher, and Maximilian of Bavaria. He died at Dresden, Dec. 3, 1857. See Munich; consult also Lives, F. Eggers, 1873-87; and, in English, E. D. Cheney, 1893.

Raudnice or **RAUDNITZ**. Town of Bohemia, Czecho-Slovakia. It stands on the left bank of the Elbe, 25 m. from Prague. Its castle, built in the 17th century, contains a library of 60,000 vols. and a collection of pictures. The town has some small manufactures. It gave the title of duke to the family of Lobkowitz. Pop. 9,300.

Raumer, **FRIEDRICH LUDWIG GEORG VON** (1781-1873). German historian. Born at Wörlitz, Anhalt, May 14, 1781, he was educated in Berlin and at the universities of Halle and Göttingen. After serving in the Prussian civil service, he became a professor of history at Breslau, and from 1819 to 1847 was professor at Berlin. He was a member of the Frankfurt Parliament, 1848, and afterwards of the Prussian diet. He died in Berlin, June 14, 1873. Raumer's most famous work is his *History of the Hohenstaufen*, 1823-25; this was at one time highly popular, but it is now somewhat superseded. He also wrote a *History of Europe* from the end of the 15th century, 1832-50, and books on England in 1835, on Italy, and on the United States, all the results of visits to those countries.

Raunds. Urban dist. of Northamptonshire, England. It is 8 m. from Wellingborough, with a station on the Mid. Rly. S. Peter's church has a famous spire, 183 ft. high. It contains some old tombs, and has other interesting features. The chief industry is the manufacture of boots and shoes. Pop. 3,900.

Ravalliac, **FRANÇOIS** (c. 1578-1610). French assassin. Born at Angoulême, he was a valet and schoolmaster there, later entering a religious order, from which he was expelled. He claimed to be favoured by various supernatural visions, and, hearing that Henry IV of France was about to declare

war on the Pope, went to Paris and fatally stabbed the king in the rue de la Ferrière, May 14, 1610. He was arrested red-handed and put to death by torture on May 27, 1610.

Rava Russka. Former town of Austria-Hungary in Galicia, now in Poland. It is 33 m. N.N.W. of Lemberg. An old castle is now used as a religious establishment. It gave its name to the battles fought there in the Great War. Pop. 10,000.

Rava Russka, **BATTLES OF**. Fought between the Russians and the Austrians, Sept., 1914, and sometimes called the battle of the Grodek line. The fighting took place around Tomasoff, Krasnostav, Opolie, Krasnik, Rava Russka, and Grodek. After evacuating Lemberg on Sept. 3, 1914, the Austrians, under Auffenberg, withdrew to Grodek. At this time their line stretched from the Dniester on the S. through Grodek N. to Rava Russka and towards Tomasoff, a front of 60 m. Then came a gap in marshy country, in which the Russians were active.

W. and N. of Tomasoff the Austrian line extended to a point near Krasnostav, S.W. of Cholm, whence W. it ran above Krasnik, about 20 m. S. of Lublin, to Opolie, and some 30 m. S. of Ivanogrod, a front of 80 m. Part of the 3rd Austrian army, under Archduke Joseph Ferdinand, had already been transferred to the E. towards Lemberg. To fill the gap about Tomasoff the rest of it was moved across the Vistula, the left wing connecting with the right of the 1st Austrian Army, under Dankl, a portion of which on Sept. 2 had advanced to within 11 m. of Lublin, but was beaten back. About the same time the Austrians were defeated by Russky at Tomasoff, and retreated S. The result of this severe reverse was that the Russians drove in a wedge between Dankl on the one hand, and Joseph Ferdinand and Auffenberg on the other. The Russian commanders took care to widen the gap thus made.

On the day following the fall of Lemberg a great counter-offensive against Dankl was begun by Ivanoff. He attacked Dankl's centre, which stood W. of Krasnostav, on Sept. 4, defeated it utterly, and compelled it to retreat in confusion towards the San. Ivanoff struck his next blow on Dankl's left at Opolie on the Vistula, and again routed the Austrians. Hemmed in between the Vistula and the Russian wedge through Tomasoff, they were pressed relentlessly S. by Ivanoff.

For a while the Austrians stopped their retreat and stood at bay at Krasnik, where they were supported by two German divisions. Both there and at Suchodola the Russians again triumphed, and the enemy resumed his disorderly withdrawal towards the San. On Sept. 12 the larger part of Dankl's army reached the San, while the rest of it struggled through the swamp region around Bilgoraj. As they were crossing the San, near its junction with the Vistula, the Austrians were attacked by the victorious Russians, and large masses of them, as they were moving over the bridges, were mowed down by Ivanoff's artillery.

On the other side of the Vistula a Russian force, which had swept down from Ivangorod, and had kept help from reaching Dankl from the W., had captured Sandomierz. By Sept. 23 Dankl was driven back to the line of the Wisłoka, well behind Przemyśl. Meanwhile on the E., at Grodek and Rava Russka, the Austrians, with their German supports, under Joseph Ferdinand and Auffenberg were as heavily and as decisively beaten. First from about Sept. 6 the Russians attacked this line from the N. and proceeded to outflank it, doubling it back on Rava Russka, about which there developed a sanguinary struggle, ending in a Russian victory.

On Sept. 8 Brusiloff attacked Grodek, and after heavy fighting, the Russians stormed the enemy's main positions with the bayonet, capturing the stronghold on Sept. 14. About the same time Rava Russka fell into their possession. In the series of great battles fought after the fall of Lemberg up to and including Grodek the Russians officially estimated that the Austrian losses amounted to 250,000 killed and wounded, 100,000 prisoners, and 400 guns, besides vast quantities of stores. The Russian losses were put at less than one-fifth of the Austrian. See Grodek; Lemberg, Battles for; Przemyśl.

Ravelin (Ital. *rivellino*). Entrenchment having two faces forming a salient towards the enemy. It is generally used in front of that part of the fortification which has a straight face, but affords a certain amount of flanking and enfilade fire against attacking troops. See Fortification.

Raven (*Corvus corax*). Large bird of the crow family. It is found throughout the N. portions of both hemispheres. Its plumage is black with purple reflections, and it is about 25 ins. in length. The beak is notably strong and massive. The raven was formerly

common throughout Great Britain, but is now found only in mountainous and secluded districts, more especially about the N. shores of Scotland and in the Western islands. A few pairs still breed on the rocky coasts of S.W. England and in Wales. It is a powerful bird on the wing and soars high in the air, but it rises from the ground in a very slow and flapping fashion.

It begins nest-building in January, choosing for the site a ledge on some inaccessible cliff, though occasionally the nest has been found in a tree. The same nest is used year after year, and the birds pair for life. The raven is omnivorous in diet, and all kinds of animal

food, eggs, fruit, grain, insects, and grubs are readily devoured. Small lambs and rabbits are sometimes attacked and eaten, but usually only sickly or injured animals are chosen. In



Raven, a bird of the crow family

captivity the raven makes an intelligent, amusing, but very mischievous pet. See Eggs, colour plate.

Raven-Hill, LEONARD (b. 1867). British artist. Born March 10, 1867, and educated at Bristol and Devon Co. School, he studied at Lambeth school of art, and in Paris under Bouguereau. After painting and exhibiting at the Salon and Royal Academy for some years, he founded the illustrated Butterfly, 1893, and in 1896 began to draw cartoons for Punch.

Ravenna. Prov. of N.E. Italy, in Emilia, and bordering on the Adriatic Sea. A fertile plain, it is low-lying in the coastal district, and marshy in the N. Well watered by streams flowing from the Apennines and intersected by canals, it produces rice, hemp, cereals, oil, wine, and chestnuts. The manufactures include faience ware, glass, paper, silk, linen,

and leather articles. Its area is 715 sq. m. Pop. 256,000.

Ravenna. City of Italy, capital of the prov. of Ravenna. It stands in a marshy plain, between the



Ravenna, Italy. Basilica of S. Apollinare in Classe, with campanile; top, right, cathedral, and, right, baptistery

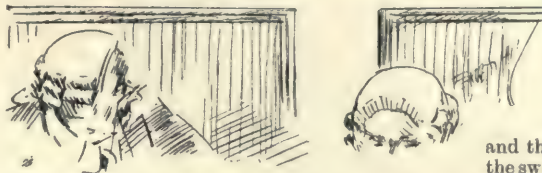
rivers Fiumi Uniti and Lamone, 6 m. from the Adriatic, 44 m. by rly. E.S.E. of Bologna. It is still surrounded by old walls, which were once washed by the waters of the Adriatic. Of very ancient origin, it is second only to Rome in the importance of its early Christian art, and for 350 years was virtually the capital of Italy. Its archbishopric was founded in 493,

and its cathedral dates from the 4th century. Other old churches are those of S. Giovanni Evangelista, dating from 425; San Vitale from 520; S. Apollinare in Classe from 535; S. Apollinare Nuovo from 500; the Mausoleum of Galla Placidia from 440, notable for its mosaics; the Orthodox Baptistery from 450, etc. The old city castle, partly demolished in 1735, is in the N.E. quarter.

Of its important Roman structures nothing now lies above ground. Deserted by the sea and shrunken from its former greatness, Ravenna contains a museum of Roman and Byzantine antiquities, the tomb of Dante, and a valuable library. Manufactures include musical instruments, silk, lace, glass, and wine.

A famous fortress, protected by marshes, Honorius sought refuge in Ravenna from 404. Odoacer held it for three years against Theodoric, and in 539 it was once more captured by Belisarius. Ravenna was the seat of the exarch of the Eastern Emperor until 752. Later it was held by Venice

and the Popes, remaining under the sway of the latter until 1859, when it became Italian. Near the town is an obelisk erected to the memory of Gaston de Foix, who fell in battle here



First Burglar: "Who are yer a-shovin' of?"
Second Burglar: "Who's a-shovin'? I've got as much right to be 'ere as you 'ave."—PICK-ME-UP

Leonard Raven-Hill. Example of his line-work

after defeating the papal and Spanish forces on April 11, 1512. Pop. 74,000. See Dante.

Ravensburg. Town of Württemberg, Germany. It stands on the Schussen, 11 m. N.N.E. of Friedrichshafen. The town, which consists of the old town and modern suburbs, is encircled by medieval fortifications. The most important buildings are the 16th century Rathaus and the Veitsburg tower, which stands on the site of the old castle of the Guelphs. The industries include weaving and dyeing, and there are manufactures



Ravenna, Italy. Basilica of S. Vitale; top, right, column of Gaston de Foix, erected in 1557 to commemorate his victory over the Spaniards in 1512

of machinery, paper, stained glass, and a trade in wine, wood, and cattle. Ravensburg belonged to the Hohenstaufens in 1180 and became a free city in 1276. It passed to Württemberg in 1810. Pop. 15,600.

Ravenscar. Seaside resort of Yorkshire (N.R.), England. It is 10 m. from Scarborough, with a station on the N.E. Rly.

Ravenscourt Park. London district and park, in the W. of the bor. of Hammersmith. The park, 32½ acres, from which the dist. takes its name, was in 1887 acquired by the local vestry and met. board of works for £53,000, and passed under the control of the L.C.C. in 1889. Since 1887 about one acre has been added. E. of the ornamental lake is Ravenscourt Mansion, an 18th century successor to the ancient manor house of the manor of Paddenswick or Palingswick, a gift of Edward III to his favourite, Alice Perrers or de Windsor (d. 1400), and commemorated in the name of the adjacent Paddenswick Road. The park has an avenue of elms leading from the King Street entrance, a bowling-green, tennis courts, and an old English garden. See History and Antiquities of Hammersmith, T. Faulkner, 1839; Municipal Parks, J. J. Sexby, 1898.



Ravenspur. Ancient seaport of Yorkshire. It stood near Spurn Head, and in the 14th century was a prosperous seaport. It was represented in Parliament, and here, in 1399, Henry IV landed. Soon, however, the sea began to encroach, and by 1500 the

place had disappeared.

Raventhorpe. Village of Northamptonshire, England. It is 8 m. from Daventry. The chief building is the church of S. Dionysius with some objects of antiquarian interest. Another Ravenshorpe is a village in Yorkshire (W.R.). It is a manufacturing centre. Pop. 5,700.

Ravenswood. Town in Kennedy district, Queensland, Australia. It is the terminus of a short branch line from the Townsville-



Edgar Ravenswood and Lucy Ashton. From the painting by Sir John Millais

Cloncurry rly., is 78 m. from Townsville, and the centre of one of the smaller gold-fields, dating from 1870. Pop. 2,000.

Ravenswood. Drama in blank verse by Herman Merivale. It was produced Sept. 20, 1890, by Henry Irving, at the Lyceum Theatre, London. It was a fairly effective stage version of The Bride of Lammermoor, in which Henry Irving played Edgar, Master of Ravenswood, and Ellen Terry Lucy Ashton.

Ravenswood, EDGAR. Hero of Scott's novel The Bride of Lammermoor. The last of his line, his inheritance being the old Tower of Wolf's Crag and a legacy of revenge against the pillager of his house, Sir William Ashton, he saves the life of Sir William's daughter Lucy, their betrothal and a family reconciliation following. Through Lady Ashton's treachery, Lucy is induced to marry Bucklaw, loses her reason, and dies. In fulfillment of an old prophecy Edgar is swallowed up in the quicksands of the Kelpie's Flow while on his way to a duel with Lucy's brother, Colonel Ashton. See Ashton, Lucy.

Ravensworth. Village of Durham, 3 m. from Newcastle-on-Tyne. Here is Ravensworth Castle, the seat of Lord Ravensworth. It was built early in the 19th century on the site of an earlier castle. Lord Ravensworth, who takes his title from this place, belongs to the Liddell family. In 1642 Thomas Liddell (d. 1650) was made a baronet for supporting Charles I, and in 1821 Thomas Henry, the 6th baronet, was made a baron. Henry Thomas, the 2nd baron, was made an earl in 1874, but the earldom became extinct when the 3rd earl died in 1904.

Ravi. River of the Punjab, India. It rises near the Rotang Pass in Kangra, and flows N.W. through S. Chamba and, in general, S.W. to join the Chenab, 35 m. N. of Multan. At Lahore there are fine masonry bridges for the rly. and the Grand Trunk Road. So much water is taken for irrigation into the Upper Bari Doab canal that in Montgomery dist. the river bed is dry for months at a time. Its length is 450 m.

Rawalpindi. Division and dist. of the Punjab, India. The division lies in the N.W. of the province; it is sparsely populated, mainly by Mahomedans. Wheat is the chief crop. The dist. lies W. of Kashmir and W. and N. of the Jhelum. Most of it is a high plateau, much dissected by ravines. Forest covers a considerable area. Wheat, pulses, and millet are grown. Area, div., 21,391 sq. m.; dist., 2,010 sq. m. Pop., div., 3,353,000; dist., 548,000.

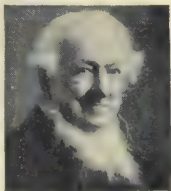


Rawalpindi, India. The strategic fortress which commands the routes into India from the north-west

Rawalpindi. Town of the Punjab, India. It is situated on a tributary of the Sohan, has strategic roads and rlys., and is the most important military cantonment in N. India. It has rly. workshops, a brewery, and contains an arsenal. There is an extensive trade with Kashmir. In 1849 the Sikhs surrendered here subsequent to their defeat at Gujarat by Gough. Pop. 86,500.

Rawdon or **RAWDEN.** Urban dist. of Yorkshire (W.R.). It is 5 m. from Bradford, with a station on the Mid. Rly. The chief industry is the manufacture of cloth, and here is a Baptist theological college, opened in 1859. The marquess of Hastings took from here the title of the earl of Rawdon, his ancestors having lived at Rawdon Hall. Pop. 3,200.

Rawlinson, GEORGE (1812-1902). British scholar. Born at Chadlington, Oxford, Nov. 23,



George Rawlinson,
British scholar
Elliott & Fry

1812, he was educated at Trinity College, Oxford. He became a fellow and lecturer of Exeter College, and was ordained, and in 1861 was made Camden professor of ancient history. In 1872 he was chosen canon residentiary of Canterbury, and he was rector of All Hallows, Lombard St., London, from 1888 until his death, Oct. 7, 1902.

Rawlinson is chiefly remembered by his great edition of Herodotus, with translation and annotations by himself, and special archaeological and historical dissertations by his brother, Sir Henry Rawlinson (*q.v.*), and Sir J. G. Wilkinson. The translation has been reprinted in the Everyman's Library series. Rawlinson also wrote scholarly and valuable works on Assyria, Chaldea, Babylonia, Media, Persia, Parthia, the new Persian Empire, and ancient Egypt.

Rawlinson, SIR HENRY CRESWICK (1810-95). British Orientalist and diplomatist. He was born at Chadlington, Oxfordshire, April 11, 1810, and entered the

service of the East India Company in 1827. Six years later he undertook the reorganization of the Persian troops, and devoted his leisure to the study of the cuneiform inscriptions. In 1840 he became political agent at Kandahar, and rendered valuable service throughout the Afghan War. Four years later he was made consul at Bagdad, where he collaborated with Layard in his excavations at Nineveh and elsewhere. He made an extensive collection of antiquities, now in the British Museum. In 1859 he was appointed minister plenipotentiary to Persia, but retired a year later. He was M.P. for Reigate, 1858, and Frome, 1865-68. Rawlinson wrote largely on the cuneiform inscriptions, and was the author of a History of Assyria, and joint editor with his brother, G. Rawlinson (*q.v.*), of the latter's Herodotus. He was made K.C.B. on his return from India, and a baronet, 1891. He died in London, March 5, 1895. See Memoir, G. Rawlinson, 1898.



Sir H. Rawlinson,
British Orientalist

Rawlinson, HENRY SEYMOUR RAWLINSON 1ST BARON (1864-1925). British soldier. Born Feb. 20, 1864, he was the eldest son of Sir H. C. Rawlinson (*q.v.*), to whose baronetcy he succeeded in 1895. From Eton he went to Sandhurst, and in 1884 joined the 60th Rifles, transferring to the Coldstream Guards in 1892. Meanwhile he had been A.D.C. to Lord Roberts in India, and had served with the mounted infantry in Burma in 1886-87. In 1898 he joined Kitchener's staff in Egypt, and was in the expedition that recovered Khartum. In the South African War he served on the staff and commanded a mobile column. Having passed through the Staff College, he was commandant of that institution from 1903 to 1906. In 1907 he took over a brigade at Aldershot, and in 1910 he was promoted to the command of a division.

When the Great War broke out Rawlinson was made director of recruiting at the war office. In Sept. he was put at the head of the 7th Division, which he led through Belgium to Ypres, in such desperate fighting that it was soon reduced to a mere handful. In 1915 it was renewed, and under him took a leading part at Neuve Chapelle. At the end of 1915 he was given command of the new Fourth Army, and was responsible for the main attack on the Somme in July, 1916. He continued at the head of this army until early in 1918, when he was chosen as British representative on the Versailles council.

In March, however, after the disaster of St. Quentin, Rawlinson was recalled to the front, and his Fourth Army took a brilliant part in the final offensive. In March, 1919, Rawlinson, who had been knighted in 1915, and made a full general in 1918, was appointed to the Aldershot command. In 1919 he was created a baron, and awarded £30,000 for his war services. Commander-in-chief in India, 1920-25, he died Mar. 28, 1925, when the peerage became extinct.

Rawmarsh. Urban dist. of Yorkshire (W.R.). It stands on the Don, and is 2 m. from Rotherham,



Baron Rawlinson of Trent,
British soldier

Russell

with a station on the Mid. Rly. The chief industries are the making of iron and steel, bricks and pottery. The principal building is the church of S. Lawrence. Pop. 17,000.

Rawnsley, HARDWICKE DRUMMOND (1851-1920). British divine. Born at Shiplake, near Henley, Sept. 28, 1851, the son of a clergyman, he was educated at Uppingham and Balliol College, Oxford. Having been ordained in 1875, he became vicar of Wray, Windermere, in



H. D. Rawnsley,
British divine
Elliott & Fry

1878, and of Crosthwaite, Keswick, in 1883, resigning in 1917. He died May 28, 1920. Rawnsley was known for his efforts to preserve the beauties and associations of the Lake District. He wrote several volumes on the district, some verse, and other books, including *Memories of the Tennysons*, 1900. He was hon. sec. of the National Trust (*q.v.*).

Rawtenstall. Mun. borough of Lancashire, England. It is 19 m. from Manchester, with a station on the L. & Y. Rly. Cottons and woollens, felts and slippers are manufactured, and there are coal mines in the neighbourhood. Owing its growth to the industrial development of the 19th century, it was made a borough in 1891. Pop. (1921) 28,381.



Rawtenstall arms

Ray. In geometrical optics, a line of light. It was defined by Newton as the least portion of light that can be propagated or stopped alone. More recently it has been described as the motion of a particle of light; and is more precisely defined as the straight line in which the radiant energy that produces the sensation of light is propagated to any given point. *See* Reflection; Refraction.

Ray. Name given to many fishes of the elasmobranch order. It includes the sharks, skates, and other forms. In the rays the skeleton is cartilaginous, the body is flattened, and the pectoral fins greatly expanded. *See* Skate.

Ray, EDWARD (b. 1878). Professional golfer. He played for England v. Scotland in 1906, 1907, 1909, and 1910, won the Open Championship, 1912, and the U.S. open championship in 1920. Ray was the author of *Inland Golf*, 1913.

Ray OR WRAY, JOHN (1627-1705). English naturalist. Born at Black Notley, Essex, Nov. 29, 1627, his father was a blacksmith. He was educated at Brain-tree and Cambridge, and became fellow and lecturer of Trinity College. He was ordained, but in 1662, owing to the Act of Uniformity, he resigned his offices and devoted some time to travelling. He wrote accounts of his journeys, both in Great Britain and abroad, and with his friend, Francis Willughby, made extensive collections of flowers and plants. He died at Black Notley, Jan. 17, 1705. The results of Ray's investigations and studies were published in a number of volumes. In his honour the Ray Society was founded in 1844. *See* Memorials of Ray, E. Lankester, 1846.



John Ray,
English naturalist

Rayah (Arab. *ra'iyah*, peasants, subjects, from *ra'a*, to pasture). Term applied in Mahomedan countries to the non-Mahomedan subjects of a Mahomedan sovereign, who are generally obliged to pay a special tax. In Turkey the rayah are divided into five classes or millets according to their religion, viz. Greeks, Armenians, Armenian Catholics, Latins or Roman Catholics, and Jews. *See* Rytot.

Rayleigh. Parish and village of Essex, England. It is 7 m. W. by N. of Southend-on-Sea, with a station on the G.E.R. It is mentioned in Domesday Book, and has a moated mound which marks the site of Sweyn's Castle. Pop. 2,500.

Rayleigh, JOHN WILLIAM STRUTT, 3RD BARON (1842-1919). British physicist. Born at Langford Green, Essex, Nov. 12, 1842, he was educated at Trinity College, Cambridge, being senior wrangler and First Smith's prizeman. He succeeded to the title in 1873.



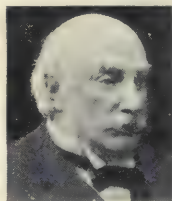
Edward Ray,
Golf champion

Appointed to the chair of experimental physics at Cambridge and director of the Cambridge laboratory in 1879, in 1884

he was president of the British Association at Montreal. He was professor of natural philosophy at the Royal Institution, 1887, a post he held till 1905, when he became president of the Royal Society. In 1908 he was appointed chancellor of Cambridge University. He died June 30, 1919.

On resigning the chair of physics at Cambridge in 1884, Rayleigh devoted the next ten years to a study of the atomic weights of gases. His researches resulted in the remarkable discovery that the atmosphere contained several, till then, unknown gases. At the meeting of the British Association in 1894, he announced the isolation of one of the gases, argon, by Sir William Ramsay, to which afterwards were added those of neon, krypton, and xenon. In other branches Rayleigh left the enduring mark of his genius, in pure mathematics, hydrodynamics, aeronautics, electricity, etc., and four volumes of his collected scientific papers were published, 1899-1903. A man of wide interests, Rayleigh made a study of spiritualistic phenomena.

He was appointed to the Order of Merit, 1902, awarded the Royal medal, 1882, and Copley medal, 1899, of the Royal Society, and in 1904 the Nobel prize for physics.



Russell

A mural tablet to him was unveiled in Westminster Abbey, 1921. (*See* Argon; Ramsay, Sir William.)

The barony to which Rayleigh succeeded was created in 1821 for the wife of Joseph Holden Strutt, M.P., an Essex landowner. Their son, John James (1796-1873), the second baron, was the father of the scientist, who, having married a sister of A. J. Balfour, M.P., was succeeded by the son, Robert John Strutt, 4th baron.

Rayleigh, ROBERT JOHN STRUTT, 4TH BARON (b. 1875). British physicist. Born Aug. 28, 1875, and educated at Eton and Trinity College, Cambridge, he early showed much of the brilliance of his father, the 3rd baron, to whose title he succeeded in 1919. He made a special study of radium, and contributed to the Proceedings of the Royal and other societies.

Raynaud's Disease. Localised contraction of the blood-vessels in the extremities, causing the fingers or toes to become cold and white, or "dead." Attacks may be

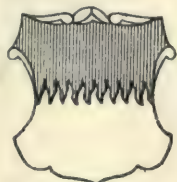
brought on by exposure to cold or emotional disturbance. The condition, which may be associated with severe pain, usually passes off in an hour or two. After repeated and severe attacks, gangrene of the fingers and toes may occur. Frequently the same digits on either side of the body are affected; hence the alternative name, "symmetrical gangrene." In severe cases the patient should be kept in bed, and the toes wrapped in cotton-wool.

Raynes Park. District of Greater London. It lies S. of Wimbledon, between Merton Park and New Maldon, in the co. of Surrey, and has a station on the L. & S.W.R., $8\frac{1}{2}$ m. from Waterloo. Pop. 5,800.

Raynouard, François Juste Marie (1761-1836). French author and philologist. Born at Brignoles, Provence, Sept. 8, 1761, he was educated as a lawyer, and became an advocate. He was confined to prison during the Revolution, owing to his Girondist sympathies, and while there wrote a tragedy, *Caton*. His single dramatic success was with *Les Templiers*, at the Comédie Française, 1805. Two years later he was elected a member of the French Academy, and in 1817 was appointed its secretary. In 1816 he began the publication of his *Choix de Poésies Originales des Troubadours*; the sixth and last volume was issued in 1821. His great *Lexique Roman*, a word-book of the medieval Provençal language, was posthumously published in six volumes, 1838-44. He died at Passy, Oct. 27, 1836. See *Origin of Romance Languages*, Sir G. C. Lewis, 1839.



F. J. M. Raynouard,
French author



Rayonné in
heraldry

Rayonne (Fr. *rayonner*, to radiate). Arrangement of trenches or fortifications in which the parapets of the series radiate from a central point. See *Fortification*.

Rayonné. In heraldry, any charge decorated with rays. The rays are usually of gold, silver, or red, and representing light or flames. The term is also applied to a line of demarcation, composed of a series of rays with wavy outline.

Razor (Fr. *rasoir*, from Lat. *radere*, to scrape). Keen-edged cutting blade employed for shaving. The custom of removing the hair from the face, either altogether or from certain parts, is one that goes far back in the history of the human race. For this purpose the razor was made of various materials before the bronze or iron ages, a sufficiently sharp edge being ground on flints, shells, or bones.

In modern times the manufacture of razors has formed a special branch of the cutler's trade, involving the use of the finest materials, and expert care at every stage of the process. The best razors are still made from special hand-forged steel, though moulded or pressed steel has been employed for mass production with satisfactory results; but whatever method is employed just depends upon the tempering of the steel, and in this matter the ordinary purchaser may have good or bad luck.

Sheffield, England, has long held the supremacy for high quality razors, as well as other tools, and when the hollow-ground razor was introduced from Germany, Sheffield was soon able to produce high quality razors of the same type.

A Sheffield man, too, Michael Hunter, is credited with the invention of the first safety-razor in 1875. This was an ordinary razor provided with a guard. Successive improvements, particularly in the U.S.A., resulted in the modern type of safety-razor, in which the blade is a thin double-edged leaf of fine steel about an inch long, which in many cases can be re-stropped by a special device. This form proved universally popular, but in many people's opinion, including that of the barbers, the old form of

razor at its best gives, of course in capable hands, the best results. See *Beard*; *Steel*.

Razorbill (*Alca torda*). British sea bird of the auk family. It is 17 ins. long in body, and the plumage



Razorbill. British sea bird allied to the extinct Great Auk

is greenish black on the upper parts, brown on the throat, and white below. The beak is very massive, and is flattened laterally; and the bird generally much resembles the extinct great auk, of which it is the nearest living relation. It occurs sparsely around the British coasts. It spends nearly all its time on the water, resorting to the cliffs in the breeding season.

Razor Shell or **RAZOR FISH**. Popular name for the solen, a common bivalve mollusc of which



Razor Shell. The common bivalve *Solen siliqua*

about five species occur around the British coasts. The shell is long and very narrow. Solens are to be found between tide marks on every sandy beach. They burrow deeply and rapidly into the wet sand.



Razor. 1. Primitive pattern, bronze. 2. Bronze razor of very early date, found in Athens. 3. Early Phoenician, with engraved bronze blade. 4. Modern razor with hollow-ground blade. 5. Type of safety-razor

1-3, British Museum

R.E. Abbrev. for Royal Engineers, for member of the Royal Society of Painter-Engravers and Engravers, and also for Reconnaissance Experimental. The last is the name of a type of British aeroplane built at the Royal Aircraft Factory, Farnborough, later known as the Royal Aircraft Establishment. The machines built there are distinguished by letters indicating the type followed by a number showing the series.

Re. In music: (1) The second of the Guidonian syllables. In Tonic Sol-fa it is the second degree of the major scale, and is spelt ray. (2) The name of D in France and Italy.

Ré. Island of France. It lies in the Atlantic Ocean, 9½ m. W. of La Rochelle, and is divided into two depts. of which the chief towns are Saint-Martin and Ars. A light rly. runs from Sablanceaux to Les Portes (22 m.) at the N.W. of the island. It is protected from the sea by sea-walls and dunes, and defended by four forts. There are considerable salt marshes and vineyards. It is about 16 m. long and 3 m. broad.

Read, CLARE SEWELL (1826-1905). British agriculturist. The son and descendant of Norfolk



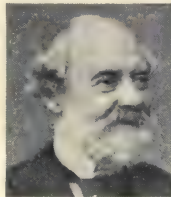
Clare Sewell Read.
British agriculturist
Elliot & Fry

farmers, he was born at Ketteringham, Nov. 6, 1826. He himself became a farmer and then a land agent in Oxfordshire, afterwards managing his own farms in Norfolk. In

1865 Read, already known as an authority on agriculture, was returned as Conservative M.P. to Parliament, and there he became the acknowledged representative of the farming interest. In 1876 the farmers recognized his work with a gift of £5,500. He remained in Parliament until 1880 and was returned again in 1884-85; from 1874-76 he was parliamentary secretary to the local government board. He was sent by the Government to report on agriculture in America, and was identified with almost every agricultural committee and organization. He died in London, Aug. 21, 1905.

Read, CHARLES (1814-84). British novelist and dramatist. Born at Ipsden House, Oxfordshire, June 8, 1814, he was the son of a landowner. Educated at Magdalen College, Oxford, he became a fellow of that society and a barrister, but soon turned to litera-

ture. He began with plays, of which the first was put on the stage in 1851. The best known, perhaps, are



Charles Read

The Lost Husband, Masks and Faces, 1852, written in collaboration with Tom Taylor, *The Lyons Mail*, *The Double Marriage*, originally a novel, and *Drink*, 1879, adapted from Zola's *L'Assommoir*. His reputation was made, however, with his novels, especially with *The Cloister and The Hearth*, 1861, which depicts in the most realistic manner the life of the 15th century, and is generally regarded as one of the masterpieces of historical fiction. Of the others may be mentioned *Peg Woffington*, 1852; *Christie Johnstone*, 1853; *It is Never too Late to Mend*, 1856, a sensational story of prison life in the early days of Australian colonisation; *Hard Cash*, 1863, an exposure of the abuses of the private asylum; *Griffith Gaunt*, 1866; *Foul Play*, 1869; *Put Yourself in His Place*, 1870; and *The Wandering Heir*, 1875. The *Perilous Secret* was published after his death, which took place in London, April 11, 1884. He dramatised several of his novels, wrote some short stories and a book on the violin, and kept laboriously elaborately classified commonplace books made up of extracts from books and newspapers. See Charles Read, a Memoir, C. Read and C. L. Read, 1887; Charles Read as I knew him, J. Coleman, 1903.

Read, WILLIAM WINWOOD (1838-75). British novelist and traveller. Born Dec. 26, 1838, and a nephew of Charles Read, he was educated at Hyde House School, Winchester, and Magdalen College, Oxford. He travelled in W. Africa, making a number of geographical and scientific discoveries, studied medicine at St. Mary's Hospital, London, and was special correspondent of *The Times* during the Ashanti War, 1873. He died April 24, 1875. In addition to *Savage Africa*, 1863; *African Sketch Book*, 1873; and *The Story of the Ashanti Campaign*, 1874; he wrote *The Veil of Isis*, or *The Mysteries of the Druids*, 1861; *The Martyrdom of Man*, 1872, 18th ed. 1910; and *The Outcast*, 1875. A powerful and promising writer, his views were rationalistic.

Reader. In universities, term applied to certain classes of teachers or lecturers. In some cases

readers assist the professors in their duties, in others they teach subjects for which there is no professorial chair in existence. In the Inns of Court, the reader was originally one who lectured on legal questions to his inn; readings on statutes, etc., are extant from the time of Edward I, and are of importance in legal history. The office still survives. See Inns of Court.

Reader, PRINTER'S. One who corrects proofs taken from type before the type is passed for the press. He is also known as a proof-reader, and the London society founded to promote his interests is called the Association of Correctors of the Press. A Readers' Pension Committee was founded in London in 1891. Allied later with the Printers' Pensions Corporation, in 1921 it controlled 13 pensions, founded partly by self-help and partly by subscriptions raised in connexion with the annual dinners in London. There is a notable picture of a printer's reader in the 1st Viscount Goschen's *Life of his grandfather*, but the modern printer's reader leads a much more strenuous and exacting life than that led by J. G. Seume. See Proof-Reading.

Reading. In general, the act of perusing and interpreting written characters. The psychological processes involved in reading naturally differ with the type of characters used to signify the thoughts or ideas to be conveyed; hieroglyphic or picture writings represent different mental actions from those used in, for example, the European languages.

Methods of teaching the art of reading, on which the communication of human thought largely depends, have likewise varied. The old alphabetic method insisted on the learner mastering the names, not the sounds, of separate letters, and combining these in syllables, words, and sentences. Valentine Ickelsamer, a German teacher, insisted in 1530 on the primary importance of the sound of letters, and the Bavarian, Stephani (d. 1850), made important phonetic advances. Jean Joseph Jacotot (1770-1840), a French pedagogue, elaborated an analytic-synthetic method, taking first the sentence, reducing it to words for the pupils, then to syllables and letters, and then rebuilding the complete sentence. A general modern tendency is to use the sentence or phrase as the unit for teaching rather than the isolated alphabetic letter. See Alphabet; Phonetics; Writing; consult also *The Psychology and Pedagogy of Reading*, E. B. Huey, 1908.

Reading. In British parliamentary procedure, term denoting successive stages in the passage or rejection of a bill. The first reading is a formal business without debate, but provides the opposition with the opportunity of rejecting the bill by moving that it be read a second time this day six months. The second reading with debate on broad lines is taken after the bill has been printed and circulated to members. After the committee and report stages, the bill as amended comes up for the third and final reading. Divisions may be taken at all stages. *See* Bill; Parliament.

Reading. County borough of Berkshire, also the county town. It stands on the Thames, where it is joined by the Kennet, 36 m. from London, and is served by the G.W., L. & S.W., and G.C. Rlys., and by the Kennet and Avon Canal. Of the churches, the chief

are those of S. Lawrence, S. Mary, S. Giles, and the restored chapel of the Grey Friars, at one time used as the town hall. Other buildings include the municipal offices, connected with which is the museum, famous for its collection of relics from Silchester (*q.v.*), and the county hospital. The town has a university college, opened in 1892.



Its buildings include Wantage Hall and S. Andrew's Hall, and in 1925 steps were taken to transform the college into a university. There is a grammar school dating from 1486. The gaol, in which Oscar Wilde wrote *De Profundis*, was closed in 1919. Some ruins of the Benedictine abbey remain, and the grounds are public property. Palmer Park and Prospect Park are other recreation grounds. On the other side of the Thames is the suburb of Caversham. Earley is another suburb.

Reading is an important agricultural centre, being especially noted for its seeds. It is also important as a rly. junction, and has large engineering works and biscuit factories. The council maintains a service of electric tramways. In 1121 Henry I founded a Benedictine monastery at Reading, and therein he was buried. It became a corporate town in the 13th century, and was later a centre of the wool trade. Henry VIII made the abbey into a palace. From 1295-1885 Reading sent two members to the House of Commons; it now sends one. Market days, Mon. and Sat. Pop. (1921), 92,274.

Reading. City of Pennsylvania, U.S.A., the co. seat of Berks co. It stands on the Schuylkill river, 59 m. N.W. of Philadelphia, and is served by the Philadelphia and Reading and the Pennsylvania rlys., and the Schuylkill Canal. Reading lies in an important coal and iron mining region, and trades in agricultural produce. It contains large rly. workshops and has iron and steel works, machine shops, woollen and worsted mills, and hosiery, hardware, and boot and shoe factories. Founded 1748, Reading was incorporated 1783, and became a city 1847. Pop. 107,800.

Reading, RUFUS DANIEL ISAACS, 1ST EARL OF (b. 1860). British lawyer and administrator. Born in London, Oct. 10, 1860, he was the son of Joseph M. Isaacs, a merchant. After an education at University College

School, London, and a brief spell at sea, he became a member of the Stock Exchange, where he gained experience which served him after he became a barrister in 1887. He had soon a large practice, especially in commer-

cial cases, and in 1898 he became a Q.C. In 1904 he entered Parliament as Liberal M.P. for Reading, and in 1910 was appointed solicitor-general and knighted. Soon promoted attorney-general, he was the first occupant of that office to be a regular member of the cabinet. In 1913 Isaacs was made lord chief justice, the first Jew to hold that position, and in 1914 a baron. During the Great War he spent much time in the U.S.A., where he was special envoy and high commissioner. In 1921 he resigned from the bench to become viceroy and governor-general of India. Made a viscount in 1916, he was raised to the rank of earl in 1917. His eldest son is known as Viscount Erleigh.



Bourne & Shepherd

Reading Room. Room, usually in connexion with a library, where accommodation is provided for students and other readers. Most great libraries include reading rooms, one of the best known being that of the British Museum. *See*

British Museum; Library.

Ready Reckoner. Table or tables showing for easy reference the rates of various wages, percentages, etc., for various periods; also the prices of a wide range of numbers of articles at so much per article. The figures or prices are arranged in tabular form, and graduated so as to simplify calculation.



Reading, Berkshire. Ruins of the Benedictine abbey; top, left, municipal offices and parish church of S. Lawrence

Real (Sp., royal). Obsolete Spanish and Portuguese coin still current in Brazil. In Spain up to 1868 the real was the tenth part of an *escudo* (*q.v.*) and of nominal value 2½d. In Portugal, from 1854 till 1911, the gold milreis or 1,000



Real. Obverse and reverse of the Spanish coin. Actual size, $\frac{25}{32}$ in.

reis was the standard. Fifty and 100 reis nickel coins were also minted, and 20, 10, and 5 reis bronze coins. The Mexican real or Mexican shilling, once circulating in the U.S.A., had a nominal value of 12½ cents.

Realgar or **RUBY SULPHUR**. Native red sulphide of arsenic. The realgar which occurs in commerce is artificially prepared by subliming a mixture of arsenic and sulphur ores. Its chief use is in the tanning industry, where it is employed, mixed with lime, for removing hair from the skins. It is used for making Indian or Bengal fire in signal lights. Artists employ native realgar as a pigment. It is found native in Hungary.

Realism. In literature, term applied to the school of writers of fiction who describe life with strict fidelity to actual fact and detail, as opposed to the schools of romanticism or classicism. The realist tendency, often called also naturalism, is found scattered in all modern literatures and at various periods, but became crystallised into a definite school, mainly under French influence, in the second part of the 19th century. The painstaking dissection of character is seen earlier in Stendhal or Balzac, but Flaubert moved forward and achieved a masterpiece in *Madame Bovary*. He was followed by the de Goncourts, J. K. Huysmans, de Maupassant, Zola, and many lesser figures. Heated controversy arose round the alleged tendency of the realists to emphasise the sordid and corrupt in life; but their influence on the novel has been far-reaching, although their lengthy and laborious elaboration of detail has given place to a more eclectic form.

In English literature realism has been tempered by characteristic moderation. George Eliot, Meredith, George Moore, Hardy, Wells, and Bennett represent phases of its growth, and the influence is seen in

the more recent stress on detailed psychological analysis in the novel, as in James Joyce or Dorothy Richardson. Gorky, Tehekov, Strindberg, Sudermann, Couperus, Hamsun, are typical of their respective countries, and the corresponding tendencies in drama are seen in such writers as Ibsen, Hauptmann, and Galsworthy.

Realism. In art, the direct representation of any subject as it is, a treatment, literally, that excludes idealism or romanticism. But the true work of art, however realistic its treatment, must perforce contain some elements of idealism, or fail in its purpose. Realism made its entry into French painting with Gustave Courbet, and strongly influenced all subsequent European art. In sculpture it expressed itself in widely different manners, through Carpeaux, Barye, and Rodin. The French example has affected British sculpture. See Idealism; Naturalism; Romanticism.

Realism (L. Lat. *realis*, from *res*, thing). Philosophical term with two distinct meanings. As opposed to nominalism (*q.v.*), it is the theory, held by certain of the schoolmen, that general ideas, the universals, had an existence independent of individuals and the individual mind. As opposed to idealism (*q.v.*), it is the theory that external objects have an existence independent of any thought about them, and that our knowledge of them is immediate or intuitive.

Reality (L. Lat. *realitas*, from *res*, thing). In philosophy, the state or quality of being real, the "thing-ness" of anything. That is real which is true and existent, such existence being absolute and necessary, either external and altogether independent of thought, or internal and dependent upon thought, but not upon the exercise of thought about it. Reality means something, possesses significance, but is not the subject of thought. The term is sometimes opposed to actuality, which rather indicates the nature and degree of reality attaching to real objects. Various kinds of reality have been distinguished: empirical, belonging to all objects of experience; objective, given to things as objects of sense-perception; subjective, in reference to a fact which is the subject of consciousness. See Metaphysics; Philosophy.

Realm. Word, a variant of the French *royaume*, meaning a kingdom. It is still used chiefly in an official sense. See Defence of the Realm; King; Sovereign; State.

Realpolitik (Ger., policy of reality). Term used during the last thirty years of the German empire

to denote the political attitude inaugurated by Bismarck and pushed to extreme lengths by his successors. The adherents of *Realpolitik* maintained that the politician should look primarily to the material interests of his nation, disregarding abstract theories and humanitarian ideals. See Bismarck; Germany; Politics.

Real Presence. Term used in theology to denote the doctrine that the living Christ is actually present in the experience of the Church and the individual believer, especially in the Sacrament of the Eucharist. The term "real" distinguishes this belief from the theory that Christ is only "symbolically" present in the sacrament.

Different views are held as to what constitutes the Real Presence and how it is produced. One holds that it is corporeal and produced by Transubstantiation (*q.v.*). Another that it is purely spiritual—an experience within the soul of the participant. Though in modern usage the term has almost always a sacramental connexion, in the N.T. it has a much wider significance. Both St. Paul and St. John lay the utmost stress upon the mystical union between the believer and the risen Lord. To be "in Christ" and for Christ to be "in us" is the prerogative of every Christian. Perhaps the fullest enunciation of the doctrine is found in the words of St. Paul, "I live, yet not I, but Christ liveth in me." See Eucharist; Incarnation.

Real Property. One of the two sections into which property is divided under English law. In early times actions at law were of two kinds, real and personal. A real action was where the plaintiff asked the court to award him the thing (Lat. *res*) sued for. A personal action, as for debt, detinue, and trespass, was where the plaintiff simply asked for a sum of money, a debt or damages. The only *res* that was worth suing for in those days was some freehold, either land, or some freehold estate, in or arising out of land; and if a plaintiff were dispossessed of any of these, the court would reinstate him in them. There were no long leases in those days. Land was generally held for a freehold estate. Its few leasehold tenancies were usually mere yearly holdings; and therefore no real action would lie in respect of them. They were called chattel interests in land. In this way property in England came to be divided into real and personal; real being those kinds of property in respect of which a real action could be brought; while everything else was personal.

Real property, on the death of the owner interested, goes to his heir. Other property passes to his administrator to be divided among his next of kin. In real property is included land held for a freehold or copyhold estate. Certain rights arising out of land are also real, as rights of fishery, rights of way, profits à prendre. The title deeds of real property are themselves real. So are advowsons, tithes, dignities, certain offices, e.g. the office of hereditary earl marshal of England. But a lease for years is not real, but personal property. See Land Laws.

Realschule. Name given in Germany to a class of secondary schools wherein science, modern languages, and modern subjects generally are taught to the exclusion of the classics. The older German public schools were the gymnasia, wherein the teaching was, and is, very largely classical, and as a revolt against this *realschulen* were established in the 18th century. To-day they train boys for business life, the usual course being for six years, while there are *Oberrealschulen* for those who wish to take up mathematics or science at a university. Before the Great War, those who had passed through a *realschule* were only expected to serve for one year in the army.

Ream. Measure of paper. It consists of 480 sheets, or 20 quires. The perfect, long, or printer's ream contains 516 sheets, the surplus to make up for waste; a news ream, for printing newspapers, is 500 sheets. The word is derived from the Arabic word *rizmah*, a bundle.

Reaping. Method of cutting grain. In early times all grain was cut by the reaping hook. Machine cutting, introduced in the 19th century, has now superseded hand work, except where the crops have been badly laid by storms.

With a self-delivery reaper, horse-drawn, and a five-foot cutter bar, reaping, in any but the smallest fields, should proceed at the rate of about half an acre an hour. In this case six to eight persons will be required to tie the crop and two to do the stacking. If cutting can be done around the field, the rate will be greater and more hands required. The binder is heavier of draught and slower than the reaper, but effects a great economy in labour. Where a binder is used two or three hands only are required for stooking. In the case of wheat and oats reaping should always begin before the crop is fully ripe. Barley is the only crop which should be dead ripe.

The reaping machine, in its simplest form, is closely allied to the

mower. The cutting is effected in both cases by a rigidly fixed cutter bar beyond which is fixed a small travelling wheel to preserve the balance. Early reapers allowed the cut grain to fall behind the track. The shearer, which employs a reciprocating rake, is an American invention first brought to England in 1862. The self-delivery reaper is more complicated, and is provided with revolving sails that press the corn against the fingers, and when cut throw it clear at the side, free from the horse walk. The self-binder is still more elaborate, and provided with an arrangement by which successive sheaves are tied up and deposited at the side. See Agriculture; Canada; Crops; Wheat.

Rear-Admiral. Officer of the British navy, the lowest of flag rank. He is distinguished by the broad gold band with one narrow gold band, and curl above it upon the cuff. Rear-admirals are the next in rank above commodores,



Rear-Admiral's cap badge

1st and 2nd class, and equivalent to major-generals in the army and to air vice-marshals in the R.A.F. See Admiral, colour plate.

Rear Guard. Troops detached as a rear screen for the protection of a force on the move in hostile country. Like the advanced guard, it consists of infantry, artillery, engineers, and cavalry, but a rear guard should be very strong in the mounted arms when the enemy is in pursuit, and the main body is not in a condition to fight. The pursuing troops must be kept at a distance, and yet the rear guard must avoid being itself cut off from its main body. A rear guard by making a great show of strength induces the enemy to waste time in arranging a formal attack. See Flank Guard; Main Body; Main Guard; Patrol.

Reason (Fr. *raison*; Lat. *ratio*). Mental faculty and process of drawing conclusions from premises. It embraces the collective ideas and judgements which are common to all men and are distinguished by certain characteristics from the ideas and judgements which are the result of experience. The principles of reason are necessary, since they are the conditions of thought, and it is impossible to imagine their contrary; and universal, since they are applicable to all real or possible cases under the same conditions. The generally accepted principles

are: identity (*q.v.*), A is A; sufficient reason (*q.v.*); contradiction, A is not not-A, a thing cannot be other than what it is; the excluded middle, A is either B or not-B, a thing must be either one thing or another; substance, the permanent element underlying the manifold and shifting phenomena; causality, everything has a cause.

Reason, as contrasted with instinct, denotes the mental faculties which distinguish men from other animals; it is also used as the opposite of insanity. The word is also applied to the faculty which enables us to apprehend intuitively, without analysis, certain truths, which are related to particular judgements as a reason to the consequence. Kant defines intuitive reason as the faculty which supplies the principles of knowledge *a priori*; pure reason is the faculty which supplies the principles of knowing anything entirely *a priori*; practical reason is the source of a *priori* moral principles. Understanding, as opposed to reason, is discursive. See Cause; Logic; Metaphysics; Rationalism.

Réaumur, René Antoine Ferchault de (1683–1757). French physicist and naturalist. Born at



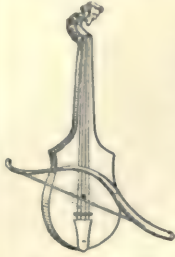
R. A. F. de Réaumur, French physicist

La Rochelle, Feb. 28, 1683, he went to Paris in 1703 to study mathematics and physics, and became a member of the Academy of Sciences, 1708. He made a study of the properties of iron and steel, and also invented a method of tinning iron, that is still employed, experimented in artificial incubation, and wrote much on marine animals, insects, etc. He gave his name to the Réaumur thermometer, in which the boiling point of water is 80°. He died Oct. 17, 1757. See Thermometer.

Rebate. In commerce, an allowance or discount deducted in cases of prompt payment, or of proved inferior quality or short delivery of goods ordered. The term is also used for the deduction made from excise duties, licences, income tax, etc., under certain conditions. In carpentry, rebate is an alternative term for rabbet (*q.v.*). See Discount.

Rebec. String instrument of Oriental origin, played with a bow. First mentioned in the 8th century, it seems to have died out about the middle of the 17th century. Its shape was that of a pear cut in half longitudinally. In the Middle Ages there were different sizes, forming

a set corresponding to the various voices. A modification in the 12th century was called the Rubebe or



Rebec, with bow

Rybybe, which eventually became the parent of the viol and the fiddle. There is a stone carving of the rebebe in the crypt at Canterbury Cathedral.

Rebecca. Character in Scott's novel

Ivanhoe. The beautiful daughter of the wealthy Jew, Isaac of York, it is at their house that the wounded Wilfred is nursed after the tournament. In love with *Ivanhoe*, but aware of his attachment to Rowena, she tries to induce their captor, Bois-Guilbert, to release her rival. She defies the Templar by threatening to throw herself from the Tower of Torquilstone, is accused of sorcery, and successfully championed by *Ivanhoe*. The character was suggested in part by a Philadelphia Jewess, Rebecca Gratz, whose story was told to Scott by Washington Irving in 1817, and retold by Gratz van Rensselaer in the *Century* magazine, Sept., 1882.

Rebecca Riots. Name given to riots that took place in South Wales in 1839 and more seriously in 1843. There were various reasons, economic and social, for the unrest, but the immediate one was the heavy charges at the toll-gates. The rioters took hold of a passage in Genesis 24, in which it is said of Rebekah, "let thy seed possess the gate of those which hate them." They went about, often on horseback, often disguised as women, and destroyed many toll-gates and houses. Emboldened by success, they grew more formidable, and soldiers were sent to deal with them. They were then soon suppressed and their main grievance remedied.

Rebekah. In the O.T., sister of Laban and wife of Isaac. The mother of Jacob and Esau, she invented the plan by which her favourite son Jacob deprived Esau of his father's blessing. She was buried in Abraham's tomb in the field of Machpelah (Gen. 22, 24-27, 49). As a popular Christian name among the Jews the name is commonly spelt Rebecca.

Rebus (Lat., by things). Allusive representation of a name or thing by means of pictorial devices. In heraldry, such devices were common during the Middle Ages.

Similar devices were used by some of the early printers and others not possessing armorial bearings. See *Allusive Arms*.

Recalcence. Term given by metallurgists to a property of iron. If an iron wire is made red-hot in a flame, then removed, and allowed to cool, its bright colour will steadily disappear until the wire is quite dark, then, in a moment, after the wire has cooled a little more, it will suddenly glow again. This reappearing colour is the phenomenon of recalcence. It is supposed to be due to the fact that, when the cooling iron has



Rebecca, the beautiful Jewess of Scott's *Ivanhoe*. From the painting by L. Sharpe

reached a certain temperature, there takes place a change in the arrangement of the molecules of the metal, in which heat is liberated, though the temperature of the wire does not reach that of the first red-hot condition. See *Steel*.



Madame Récamier. From the painting by David, in the Louvre, Paris

Recall. Political principle in operation in some of the states of the U.S.A. It means that a municipal or other official can be removed from office if, after an election held at the instance of a certain number of citizens, he does not receive the largest number of votes.

Récamier, JEANNE FRANÇOISE JULIE ADÉLAÏDE BERNARD (1777-1849). French society leader. Born at Lyons, Dec. 4, 1777, she came to Paris, 1784, married Jacques Récamier, a wealthy banker, 1793, and about 1798 became an intimate friend of Madame de Staël (*q.v.*). After her husband's bankruptcy, 1806, she lived with Mme. de Staël at Coppet, Switzerland, where she met Prince Augustus of Prussia, to whom she was for a time affianced. In 1811 she was forbidden by Napoleon, who feared her enmity, to live in or near Paris. She returned in 1815, was the intimate friend of Benjamin Constant, and her later years were passed with Châteaubriand until his death, 1848. Her salon at L'Abbaye-aux-Bois was a famous social centre. She died in Paris, May 11, 1849. See Madame Récamier and Her Friends, H. N. Williams, 1901; Madame Récamier et ses amis, E. Herriot, 1904.

Recanati. City of Italy, in the prov. of Macerata. It stands between the rivers Musone and Potenza, 6 m. from the Adriatic and 4½ m. from its station, Porto Recanati, on the coast rly. On a hill, at an alt. of 931 ft., it has remains of a 15th century wall and gate, and a 14th century Gothic cathedral. Founded in the 10th century, and important in the Middle Ages, it was damaged by earthquake in 1741, and was sacked by the French in 1799. Pop. 15,000.

Recapitulation. Biological doctrine of development. According to this doctrine organisms, in order to survive and succeed in the same environments as those of their parents, must closely resemble those parents, and this close resemblance can only be obtained by the development of the offspring along similar lines. The child treads in the footsteps of its parent, and the steps from embryonic life to adult development must be very similar to those taken by the parent previously. In other words, it recapitulates the parental development. If it does not do so, the result is an individual unlike the parent, and therefore unsuited to its environment, and as such it will inevitably perish.

Recca or **REKA.** River of the Carso in Italy and Yugo-Slavia. It is noted for its waterfalls and caves. Its subterranean course runs from Canziano for 20 m., when the stream re-issues at San Giovanni with a width of 200 ft. and a depth of 6 ft. as the Timavo, and flows 1½ m. to the Gulf of Trieste.

Receipt. Acknowledgment of payment. It is not necessary in English law. A debtor cannot refuse to pay what he owes unless the creditor gives him a receipt. At the same time, if the creditor should so refuse, and the debtor declines to pay, and the creditor sues for his money, the judge will probably make the creditor pay the costs because of his unreasonable conduct. A receipt is *prima facie* evidence of payment; but the person who gave it is always at liberty to show, if he can, that although he gave a receipt he did not receive payment; or that there is a mistake. The receipt is not conclusive against him, although the court would require very strong evidence to decide against an unconditionally worded receipt. A receipt for money of £2 or over must bear a twopenny stamp.

Receiver. Receptacle for containing fluids. In chemistry, it is a vessel for receiving the products of distillation or decomposition, for containing gases, or for use in conjunction with an air pump. Another receiver is a cylindrical steel reservoir fitted to a railway carriage for containing gas under pressure for lighting purposes. An air receiver is a boiler-shaped steel reservoir, into which air is forced at high pressure by an air compressor. It is an essential accessory in every compressed air installation, and acts as a power reservoir and an elastic buffer between the compressor and the pneumatic appliances served. A telephone receiver is the instru-

ment in telephony which magnifies sounds and enables the listener to hear what is spoken into the transmitter. For a description of its working see Telephone.

Receiver. In English law, (1) a person appointed by the court to hold property of any kind, and preserve it for the benefit of those persons who are ultimately held to be entitled to it. As soon as a receiver is appointed, he has possession of the property, and it is a contempt of court to interfere with his possession. Receivers are appointed in partnership actions, to preserve and realize the partnership property, collect the debts, etc., also in actions by debenture holders to realize their security, and in a large variety of other cases where it is beneficial to the parties to take the custody and control of assets out of the hands of the holder, and place it in the hands of an impartial and responsible person. Generally, a receiver is required to give security, to ensure that he will faithfully carry out his duties. (2) A person appointed by a mortgagee or debenture holder under a power in the deed to receive the rents and profits of the mortgaged property, and after paying expenses, to pay what is due to the mortgagee. (See Official Receiver.)

To receive property knowing it to have been stolen (including property acquired by false pretences, or extorted by threats) is a high criminal offence. By English law it is a felony, punishable by penal servitude (3 to 14 years), or imprisonment up to 2 years with or without hard labour. The English law allows evidence to be given, on a trial for receiving, that the prisoner is in possession of other property stolen within the previous twelve months; and it also permits the prosecution to prove that within the previous 5 years the prisoner has been convicted of a crime involving fraud or dishonesty. This forms a striking exception to the English rule that a prisoner on his trial shall not be prejudiced by the jury being informed of other crimes he has committed. The reason for the exception is that persons accused of receiving generally set up the defence that they had no reason to suspect that the goods were stolen.

Receivers of wrecks are appointed under the Merchant Shipping Act, 1894, in all parts of the United Kingdom to take charge of flotsam, jetsam, and all wreckage cast up by the sea. If no owner claims it, such wreckage belongs to the crown. A receiver of wrecks has power to sell at once small parcels

of wreckage (up to £5) and perishable goods, retaining the money for the owner or the crown.

Receiving Order. Legal proceeding necessary for a bankruptcy. When, in Great Britain, a person presents his own petition in bankruptcy, or a successful petition is presented against him by a creditor, the first step to be taken is to protect his assets. Accordingly a receiving order is made, the effect of which is to vest the whole of the bankrupt's property in the Official Receiver until such time as the creditors and the court shall decide what is to be done. After this receiving order is made, the bankrupt can no longer deal with his property, nor can anyone else. For example, a judgement creditor cannot proceed with an execution. The order does not extend to the debtor's personal earnings; but it includes all other property, whether in possession or reversion. See Bankruptcy.

Receptacle. Something that receives or contains something else, e.g. a box or chest. In botany, receptacle refers to the axis of the flower, to which the sepals, petals, stamens, and pistil are attached. See Flower.



Receptacle, of the wild rose, shown at R

Recessional (Lat. *recedere*, to withdraw). Short poem by Rudyard Kipling.

Published in 1897, it was included six years later in the collection of his poems entitled *The Five Nations*. With its fervent yet dignified simplicity it may be said to have become a classic, and though parts of it are often quoted to other ends, the spirit that breathes through it is that of its religious title.

Rechabites. Religious order of the Hebrews. Founded by Jehonadab, son of Rechab (2 Kings x, 15-28), who assisted Jehu to destroy the worshippers of Baal, the sect or clan calling themselves "sons of Rechab" maintained the religion of Jehovah in purity, abstaining from wine, settling nowhere, having no possessions, but living in the land as "strangers" (Jer. xxxv, 6-7). At the approach of Nebuchadnezzar they took refuge in Jerusalem, and were held up to the Jews by Jeremiah as models of devotion and piety. The term was revived in the 19th century by a society of total abstainers known as the Independent Order of Rechabites.

Rechberg-Rothenlöwen, JOHANN BERNHARD, COUNT VON (1806-1899). Austrian statesman. Born July 17, 1806, he is remembered for his opposition to Bismarck at the Federal Diet held in 1855 at Frankfurt, but as Austrian minister for foreign affairs he supported Bismarck in common action against Denmark, 1863. He died Feb. 26, 1899.

Recherché Isles. One of the archipelagos off the S. coast of W. Australia. The islands, with rocks and reefs, from E. to W. for nearly 200 m., were explored by a scientific expedition in 1921.

Recidivist (Lat. *recidivus*, falling back). In criminology (*q.v.*), a name given to an old offender, i.e. one who has been sentenced more than once for criminal offences. The recidivists comprise on an average half the prison population of the world, and in some countries the percentage is as high as 70. Efforts are being made in many countries to face the problem by methods of preventive detention and extended police supervision. The mentally defective form a large percentage of recidivists, and the problem of the reform of the recidivist is most difficult.

Recife (Port. *Cidade do Recife*, city of the reef). Brazilian city, now included in the seaport of Pernambuco (*q.v.*).

Reciprocal (Lat. *reciprocus*, alternating). In mathematics, the reciprocal of a function or quantity is such that when multiplied by the function or quantity the product is unity. Thus $1/8$ and 8 are reciprocal numbers, $a+b$ and $1/(a+b)$ are reciprocal quantities, etc. Reciprocal equations have their roots of the form a and $1/a$. A series of quantities form an harmonic progression when their reciprocals form an arithmetical progression.

Reciprocating Motion. Motion to-and-fro in a straight line, *e.g.* that of the piston and piston-rod of a steam engine. A crank is required on the driver or driving shaft to convert reciprocating into rotary motion. Parts of machinery which move in this way are known as the reciprocating parts.

Reciprocity. In political economy, the mutual admission of goods on equal terms between nations. One of the first treaties of the kind was that between Great Britain and France in 1860. In 1854 a reciprocity treaty was ratified between Canada and the U.S.A., but it was abrogated by the latter country some years later owing to protectionist activity. In Canada, again, in 1891, the question of reciprocity with the U.S.A. aroused much controversy,

the Conservatives under Sir John Macdonald, the premier, proposing that it should be restricted to raw materials, while the Liberals favoured complete reciprocity. Negotiations with the U.S.A. on the subject came to nothing, and were unsuccessfully revived by Sir W. Laurier in 1911, but in 1893 a reciprocity treaty with France was signed. Reciprocity and retaliation are closely connected with a protectionist policy, and therefore not acceptable to convinced free traders. See Free Trade; Protection; Tariff Reform, etc.

Recitative. Species of declamatory music in which the natural accentuation of the words combined with dramatic emphasis is the first consideration. It is entirely free as regards structure, and is thus sharply differentiated from the formal airs or choruses between which it occurs. It is of two kinds: *Recitativo secco*, in which the accompaniment is as light as possible, consisting only of a few chords, played originally from a figured bass; and *Recitativo stromentalato*, in which the accompaniment forms an essential part of the effect. For an example of each see Nos. 15 and 16 in The Messiah. The dramatic scena is a development of accompanied recitative, while a great deal of Wagner's music is directly descended from it.

Recklinghausen. Town of Germany. In the Prussian prov. of Westphalia, it is about 20 m. N.W. of Dortmund. It contains the castle of the dukes of Arenberg, to whom the district formerly belonged. The Rhenish-Westphalian coal district is around here, and there are manufactures of linen, tin, cigars, and beer. Pop. 54,000.

Reclamation (Lat. *reclamare*, to cry out again). Act of winning back or recovering. It is chiefly used in connexion with the recovery of land from the sea. This consists of engineering works for excluding the sea from foreshores in river estuaries covered at high tide, and the draining of low-lying tracts which are waterlogged by the overflow of streams passing through them, or by the lack of natural drainage. In some districts, where the general level is below that of the sea, exclusion of sea and river water and the expulsion of water already accumulated have to be effected under one scheme. This has been notably the case in Holland and the fens of the Eastern counties of England.

To reclaim a foreshore, an enclosing embankment is formed rising above the level of the highest spring tides. In places where wave-

action is strong, keeping the embankment in repair may entail a great deal of watchfulness, labour, and expense. Reclaimed ground is drained by ditches emptying into a main ditch running along the inside foot of the embankment. At intervals sluices from this ditch are cut through the dyke, with flaps at the outer end; so that water is discharged when it stands higher inside than outside, but cannot enter when the tides cover the sluices. If there be not sufficient fall for gravity drainage, the water is lifted over the seawall by steam or wind driven pumps of large capacity.

Fen land is protected by dykes from streams which flow through it. A system of drains and ditches leads the water to points where it is pumped or sluiced into rivers or artificial cuts. As the ground dries it consolidates and sinks, whereas the beds of streams tend to rise if much silt is present in the water they carry. Consequently the lift to be given by the pumps may increase very considerably in course of time.

Reclamation of areas by covering them with mud, sand, or silt confined by an embankment or wall is practised only if the new ground will have high value and the material for filling is obtainable at small cost. The ideal conditions for this kind of work are found where material excavated by dredgers from a position in which it is obstructive can be turned to useful account to raise the level of land adjacent to the water where the dredger is operating. Thus, in Bombay Harbour almost a square mile of ground was reclaimed by clay cut from the bed of the harbour itself and delivered through long floating pipes. See Embankment; Netherlands; Zuider Zee.

Recluse (Lat. *recludere*, to shut up). Name given to a man or woman living alone for the purpose of devotion to religion. In medieval days such persons were known as anchorites and anchoresses. They usually lived in a cell or small building attached to a church or convent. They were dedicated to the life by the bishop, and the entrance to the cell was usually closed. But the life of the inmate was not one of undue austerity, and popular ideas on the subject are greatly exaggerated. The recluse or anchorite was distinguished from the hermit by the fact that he remained within his cell, while the latter was under no such restriction. In ordinary language anyone who shuns society is called a recluse. See Anchorite.



Reclamation of Land. 1. Thames side, by Somerset House, in 1860-61, looking up river at low tide. Note men standing on river bed. 2. Somerset House and Victoria Embankment, looking down river, in 1921. 3. Water Gate, Buckingham Street, in 1780, with the river at high tide. 4. Water Gate and Embankment Gardens, with temporary huts built during the Great War. The Water Gate now stands 130 yds. from the river edge

1. Stereoscopic Co.

Recognizance. In English law, a written acknowledgment of a debt due to the crown, with a condition that the debt shall be void if such-and-such a thing is done, or not done. Thus a prosecutor is bound in the sum of £20, but the money is not to become payable if the prosecutor appears to prosecute the accused at the next sessions, etc. A surety for bail enters into a recognizance, promising to pay a certain sum; but if the prisoner shall appear to take his trial at the next sessions, etc., the recognizance is void. See Bail.

Recollet Fathers (ultimately from Lat. *recolligere*, to gather together). Name given to the Friars of the Strict Observance, a section of the Observantine branch of the Franciscan Order. An alternative spelling of the name is Recollect. They were founded about 1489 by Juan de Puebla in Sierra Morena, Spain, and did much missionary work in S. America. They also spread into Italy and France. These friars have charge of the sacred places of the Latin observance at Jerusalem. The name Recollettes has been adopted by a reformed branch of the Poor Clares. See Franciscans; Monasticism.

Reconnaissance. Military term for the employment of troops to obtain information in war as to the topographical features and resources of a country, or the movements and dispositions of an enemy. Strategic reconnaissance is required before the opposing armies are within striking distance of one another; the frontier raids which immediately follow a declaration of war are of this character. Tactical reconnaissance is the work of advanced guards and outposts when hostile forces are in contact, and battle plans are dependent on knowledge of the enemy's preliminary dispositions. Aircraft and cavalry are principally used for reconnaissance work. See Patrol; Strategy; Tactics.

Reconstruction (Lat. *re-*, again; *construere*, to put together). Process of building up again. The term is specially applied in American history to the process of restoring normal relations after the Civil War between the seceded southern states and the Union. It was again employed in 1917 and subsequent years to describe the plans evolved for the rebuilding of Europe after the Great War. See Reconstruction, Ministry of.

Reconstruction. Term used in commercial law. When a limited liability company has suffered heavy capital losses, and it is not desired that the concern shall cease business altogether, it is not unusual to reconstruct the company. This is generally done by formally winding-up the company and transferring its business and assets to a new company, paying for the assets by shares in the new company which are only partly paid up. These shares are distributed amongst the old shareholders, with the result that each one becomes liable to pay certain further "calls" to provide more funds.

Thus, suppose the old company's capital was £10,000 in 10,000 £1 shares, all of which have been paid up, the new company will pay for the business and assets 10,000 £1 shares credited with 10s. paid up. The effect is that each shareholder will receive share for share, but he will have to meet a fresh liability of 10s. on each share. There are several other methods. See Company Law.

Reconstruction, MINISTRY OF. Department of the British Government formed in 1917 to prepare for the end of the war with its release

of enormous numbers of men and its cessation of war industries. It arose out of a committee appointed "to recommend to the Government the inquiries which should be made and the steps which should be taken in connection with the restoration of peace conditions." This was formed early in 1917, although before then there had been something of the kind in H. H. Asquith's ministry; the premier, D. Lloyd George, was its chairman. In Aug., 1917, the ministry was formally established, the first minister being Dr. Christopher Addison. Later it was amalgamated with the ministry of national service, the combined departments being known as the ministry of national service and reconstruction. It was wound up in Sept., 1920.

Record. In English law, a collection of documents relating to an action. In the higher courts the writ of summons, the pleadings, and all material documents in the case down to the judgement are filed in court, and the whole of these together are called the record. Sometimes, when an action is compromised before trial, the parties ask the court to be allowed to withdraw the record, which is equivalent to asking that the case be withdrawn from the cognizance of the court. At one time all the documents forming the record were engraved on parchment, and fastened together so as to form one long sheet. This sheet was then rolled up, and preserved for ever as a memorial in the custody of an official of the chancery, who was called the master of the rolls. Nowadays they are written on paper, and bound up, and are kept in the record office (*q.v.*), where they are accessible to the public.

Courts of record are those courts whose judicial acts and proceedings are preserved. Such courts are divided into two classes, superior and inferior. The former include the House of Lords judicial committee, court of appeal, high court, etc. The superior courts have the power to fine or imprison any person for contempt of their authority, but inferior courts can imprison only for contempt committed in court.

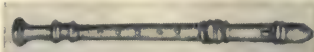
Record. In music, the name given to a cylinder or disk of hard wax or other material for the reproduction of the human voice, musical sounds, etc. The perforated roll used in piano players is also known as the record, as is the perforated ribbon used in an automatic telegraphic apparatus. In general the mechanical or automatic register of any phenomenon is known as a

record, *e.g.* a record of rainfall. See Gramophone; Phonograph.

Recorder. In England, a legal official of a city or borough. He is always a barrister of some standing. The appointment and duties of a recorder are now regulated by the Municipal Corporations Act, 1882. Under this statute, when a borough or city has a separate court of quarter sessions the crown may appoint a barrister of 5 years' standing to be recorder. He holds office during good behaviour, and is a J.P. for the borough. He must take, before the mayor and two town councillors, the oath of a justice of the peace, and sign a declaration to discharge the duties of his office well and faithfully. He has precedence next after the mayor; but cannot be M.P. for the borough nor sit on the town council. He must hold his sessions at least once a quarter, and is the sole judge there. He hears certain appeals, and can try almost any crime except murder and treason. Salaries are payable by the borough.

Recorder. Instrument of the fipple flute family, having a very soft and sweet tone akin to the song of birds. It was a very favourite instrument in Tudor times, and is referred to in Elizabethan literature, *e.g.* in Hamlet, iii, 2. Like other medieval instruments, recorders were made in sets or "chests." At Chester there is an 18th century set of four, and at Nuremberg a 16th century set of eight.

The instrument had eight finger-holes, and had a compass of about two octaves. It became known as



Recorder. Sweet-toned instrument akin to the flute

the *flûte-à-bec* or English flute, and was eventually ousted by the stronger-toned transverse or German flute. See Six Lectures on the Recorder, C. Welch, 1911.

Record Office, PUBLIC. British national institution. It is situated N. of Fleet Street, between Chancery Lane and Fetter Lane, London, E.C., on what was known as the Rolls Estate, and is the repository of state papers from 1100 to the present time. The buildings, in Tudor Gothic style, with tall, deeply embrasured windows, were designed, 1851-66, by Sir James Pennethorne and, 1891-1900, by Sir John Taylor, those with a frontage on Chancery Lane, built in the latter period, incorporating part of the Rolls chapel (*q.v.*), and covering the site of the old court of the master of the rolls. The small muniment rooms are arranged along narrow brick-paved



Record Office, London. Main front of the building, Chancery Lane. Top, right, the museum where rare historical documents are exhibited

passages, the entrances to which are guarded by iron doors, and the shelves on which the documents are preserved are of slate. The keeper is the master of the rolls, and the staff includes a deputy keeper, secretary, and 21 assistant keepers, the administrative expenses in 1920-21 being estimated at £37,850. Facilities are offered for private research work, *e.g.* Dr. Wallace's Shakespearean discoveries were made by him when examining documents belonging to the court of requests, and students' tickets permit inspection of all papers down to the beginning of the 19th century. There is also a record office in Dublin Castle.

In England, public records were first ordered to be kept by Henry I

early in the 12th century. Before the existing Record Office was built they were deposited in the Rolls Chapel, the Tower of London, the chapter house of Westminster Abbey, the state paper office in St. James's Park, and elsewhere. Among the treasures in the Record Office museum are William the Conqueror's Domesday Book, the Domesday chest, the treaty of the Field of Cloth of Gold, the anonymous letter to Lord Montagu which led to the discovery of the Gunpowder Plot, the black book of the exchequer, plan of the Kirk o' Field, log of the Victory during the battle of Trafalgar, dispatch of Wellington relating to the battle of Waterloo, and the bull of Clement VII confirming Henry VIII in the title of defender of the faith, etc. There are a long series of royal charters, patent rolls, records of the Star Chamber and other historic courts, and MSS. concerning the suppression of the monasteries. Many volumes have been issued under the aegis of the office, calendars of state papers, for example, as well as several unofficial works based upon private research among its archives; but masses of documents still await expert examination. *See* Handbook to the Public Records, S. R. Scargill-Bird, 3rd ed. 1908; Sources and Literature of English History to about 1485, C. Gross, 2nd ed. 1915.

Recruit. British destroyer. Of the C class, she was launched in 1896. She was sunk by a German submarine in the North Sea, May 1, 1915, with the loss of about 25 lives. Her displacement was 350 tons, and her engines of 6,000 h.p. gave her a speed of 30 knots. A new Recruit, launched Dec., 1916, was sunk by a mine, Aug. 9, 1917.

Recruiting. Raising of men for military or naval forces. The term is generally applied to the system of voluntary enlistment, in which the man binds himself to agreed conditions of service for a definite period, as practised in Great Britain or the U.S.A. Some authorities have estimated the general superiority of a recruited over a conscripted army at 30 p.c. Voluntary recruiting was temporarily abandoned during the Great War, as the Military Service Acts, 1916-18, established compulsory service, but ordinary recruiting was re-established in 1919, with revised conditions of service. The administration of recruiting is under the dept. of the adjutant-general in the war office. *See* Army; Conscription; Derby Scheme; Enlistment; Foreshortening; Militia; Navy; Press-Gang.

Rectangle (Lat. *rectus*, right). Plane rectilinear four-sided figure of which all the angles are right angles. The opposite sides are equal and parallel, and the area equals the product of two adjacent sides. *See* Geometry.

Rectification. Term used in English equity, or chancery law. If a mistake has been made in a deed or document, either party can bring an action to have it set right; and the court, on proof of the error, will order that the deed or document shall be rectified. Although any branch of the high court has power to order rectification of a document, all actions for rectification ought to be brought in the chancery division, to which they are assigned by the rule of court.

Rectification. In mathematics, term used for the calculation of the lengths of curved lines. Such lengths are obtained theoretically by means of the integral calculus. In practice the lengths of curves are often obtained by means of an opisometer. A wheel is run along the line, and by noting the number of revolutions the required length is deduced. In chemistry rectification is a process of purification of liquids by means of fractional distillation.

Rectified Spirits OR SPIRITS OF WINE. Name given to alcohol rectified at a licensed rectifier's premises. It is spirit which is of a minimum strength 43° over proof. *See* Alcohol; Proof Spirit.

Rectifier. In electricity, a device which converts alternating current into uni-directional current. It is frequently employed in connexion with electric arc lamps and motors taking current from an A.C. main. The electrolytic rectifier makes use of the fact that, in a cell containing electrodes of lead and aluminium, current will pass freely from the lead to the aluminium, but not in the reverse direction. By a suitable arrangement of cells in the A.C. circuit, the current can be made to flow in one direction only through the secondary circuit. The Cooper-Hewitt mercury vapour rectifier converts in a somewhat similar manner, as the vapour offers high resistance to current in one direction, but very little resistance in the other.

In the rotary rectifier the alternating current is made to drive a small synchronous motor which revolves a commutator divided round the face into two parts, from which project square interlocking teeth, those of one part insulated from those of the other. Alternating current is fed to the two parts by brushes, and picked

off by two others connected with the D.C. circuit. The collecting brushes are so spaced that one of them is always on the positive side of the zigzag line, and the other on the negative, though the two parts of the commutator change sign with a regular periodicity. Conversion is in fact similar to that of a direct-current dynamo, except that the commutator is not part of the generator, but driven by a machine in step with it.

In magnetic rectifiers one terminal of the uni-directional circuit is connected with a vibrating tongue, the other with the central point of the secondary winding of a small static transformer. A permanent magnet mounted on the tongue is affected by the reversals of magnetism in the transformer field, and causes the tongue to vibrate to and fro between the terminals of the secondary winding. At each reversal the tongue makes contact with whichever terminal is for the moment negative.

Rector (Lat., ruler). In ecclesiastical law, an incumbent of a benefice who enjoys all the tithes, whereas a vicar draws only a part. The word is also widely used in the United States for the incumbents of parishes in the Protestant Episcopal Church. The Roman Catholics use it mainly for the head of a religious house or college. At Oxford the heads of Lincoln and Exeter Colleges are known as rectors. In Scotland each of the four universities has a lord rector. He is elected by the students every three years and the office usually falls to a prominent politician or man of letters. Certain Scottish schools, e.g. Glasgow Academy, call their headmaster the rector. *See* Benefice; Ecclesiastical Law.

Rectum. Terminal part of the large intestine, ending in the anus. It is about 8 inches long. Dilatation of the veins in the mucous membrane in the lower part of the rectum gives rise to haemorrhoids or piles. Cancer of the rectum is most often a disease of middle or late life. The early symptoms are sensations of uneasiness, constipation with intermittent diarrhoea, and passage of bloodstained mucus. If the disease is diagnosed early, complete removal and recovery may be possible. A rectal fistula is an abnormal passage between the rectum and an adjacent organ or the external surface. The commonest form is a *fistula-in-ano*. A complete fistula opens internally into the bowel and externally through the skin.

Inflammation of the rectum is known as *proctitis*, and may be due to chronic constipation, new

growths, or threadworms. Pro-lapse of the rectum is a condition in which a part of the tube protrudes through the anal orifice. It occurs in children and weakly persons, or may be the result of chronic constipation, piles, and other disorders of the rectum. In the early stages cure may be hoped for by relieving the cause of the condition, particularly in children. In adults, operative treatment may be necessary. Ulceration of the rectum may be due to chronic inflammation, dysentery, tuberculosis, or syphilis.

Reculver. Place in Kent, England, the site of the Roman Regulbium. It is on the S. shore of the Thames estuary, 3 m. E. of Herne Bay. There are some remains of a fortress, and two towers, known as The Sisters, standing out boldly on the cliff, form a well-known landmark. They are remains of an Early English church and belong to Trinity House. The present church, S. Mary's, which is modern, contains some relics of the earlier one. British and Roman coins have been found here.

Recusant (Lat. *recusare*, to refuse).

Name formerly applied to those who refused to conform to the Church of England. The word was mostly used in the 16th and 17th centuries with reference to Roman Catholics who evaded the penal laws which obliged them to attend services in the English churches. While the poor recusants were imprisoned and exiled, the fines imposed on the wealthier recusant county families were a considerable asset to the exchequer. See Toleration.

Red. One of the primary colours. The red rays of light are the least reflected by the spectrum. Red colouring matters may be divided into three classes: (1) natural; (2) synthetically prepared; (3) mineral. The first includes limewood, barwood, camwood, etc., madder, cochineal, etc.; the second alizarin, etc.; and the third ferric oxide, red lead, sulphide of mercury, etc. Many of these colours are described under their separate names in this work. See also Dyes; Light; Pigment.

Red Admiral (*Vanessa atalanta*). Common British butterfly. The expanse of the wings measures

nearly 3 ins. The ground colour of the fore wings is velvety black at the tips with white spots; then comes a scarlet band, and the base of the wings is brownish. The hind wings are brown with a scarlet border. On the under side the fore wings are black with a red bar and several narrow red and blue stripes. The hind ones are brown beneath, mottled with grey and black. The insect is common in gardens and hedgerows towards autumn. The caterpillar is green with yellow spines, and feeds on nettles. See Butterfly, col. plate.

Redan. Military term for a V-shaped salient pointing towards the enemy. With the advance of modern military science it is almost obsolete, being chiefly remembered in connexion with the



Reculver, Kent. The towers called The Sisters, a well-known landmark for mariners

redans defending the south side of Sevastopol, against which a costly and unsuccessful attack was launched by the British, Sept. 5, 1855. See Crimean War; Malakoff; Sevastopol.

Red Bean (*Sophora secundiflora*). Small evergreen tree of the natural order Leguminosae. It is a



Red Bean. Foliage and flower spike

native of Texas. The glossy leaves are broken up into oval leaflets, and the violet flowers are in long sprays. The seed-pods contain five or six hard, glossy, scarlet beans which contain a poisonous alkaloid having physiological effects similar to the action of tobacco. They were formerly much used by the Indian tribes as an intoxicant, the bean being reduced to powder and dissolved in *mescal*, the spirit distilled from the fermented sap of the agave. Half a bean produced a delirious exhilaration, followed by a sleep lasting two or three days; a whole bean would kill a man.

Redcar. Urban dist. and seaside resort of Yorkshire (N.R.), England. It is 8 m. from Middlesbrough, with a station on the N.E. Rly. There is a fine beach, with good bathing and golf links. A racing centre, two meetings are held annually. The urban district includes Coatham. Pop. 10,500.

Red Chalk. In geology, bed 4 to 10 ft. in thickness found in the counties of Norfolk and Lincolnshire, England. It occurs beneath the lower chalk and is equivalent to the gault in the S. of England.



Redan. Interior of the earthwork, defending the south side of Sevastopol, which the British vainly attempted to capture in 1855. From a sketch taken after the evacuation of the fortress by the Russians

Red Crescent. Emblem used by Turkey, the equivalent of the Red Cross, which symbol is used only by Christian nations. It indicates the ambulances and hospitals of an army, and so protects them from bombardment. Persia uses for the same purpose the emblem of the Red Sun.

Red Cross. International emblem of organizations formed for the relief of sick and wounded in war, and also, since the Great War, of the famine-stricken and for fighting epidemic disease. The founder of the movement was a Swiss,



Red Cross. Flag of International Red Cross Society

Henri Dunant (1828-1910). In 1859 Dunant, when on holiday in N. Italy, found himself near the battlefield of Solferino, and spent several days in caring for men left untended by the inadequate medical services of the armies engaged. His impressions were recorded in *A Souvenir of Solferino*, 1862, which was widely translated and roused the world's conscience. As a consequence of his efforts international conferences on the subject of forming relief agencies were held in Geneva, 1863-64, resulting in the Geneva Convention of the latter year. Under this (which was accepted by 54 governments between 1864 and 1907) the International Red Cross Society was founded, with headquarters at Geneva, whose emblem was the Swiss flag with colours reversed. In 1901 Dunant was, with Frédéric Passy, one of the first recipients of the Nobel peace prize.

Red Cross, ROYAL. British decoration instituted in 1883 for nurses who tend the sick and wounded of the army and navy. It is granted in two classes; recipients of the first class are entitled as members to the letters R.R.C. after their names, those of the second class as associates use the letters A.R.R.C. Members wear a cross, enamelled red, edged with gold, having on the arms thereof the words faith, hope, charity, and the date 1883; the centre bears the royal and imperial effigy; on the reverse are the royal and imperial cipher and crown. Associates wear a cross of the same form and size, but of frosted silver,



Red Cross. British decoration for nurses

upon which is superimposed a Maltese cross, enamelled red, the centre bearing the royal and imperial effigy; on the reverse are the words, date, cipher, and crown above-mentioned. The cross is worn on the left breast attached to a dark blue riband, edged red, and tied in a bow.

All members of the nursing service are eligible for this decoration, which may be conferred also on other persons, British and foreign, who render good service to sick and wounded British soldiers and sailors, as, for example, Viscountess Northcliffe, in the Great War.

Red Cross Knight, THE. Principal character of Book 1 of Spenser's *Faery Queene*. He is regarded as a personification of reformed England, or as symbolising the victory of holiness over sin. In one line he is referred to as Saint George of Merry England. With Una, personified Truth, he sets forth as her champion to slay the dragon, which is Falsehood. Deceived by the wizard Archimago, he gets separated from Una, and they meet many adventures separately before the dragon is slain and they are reunited and betrothed.

Red Cross Society. Organization for tending the sick and wounded in war. They exist in most civilized countries. The title of red cross and the red cross on a white ground, the badge of the societies engaged in the care of the victims of war, were adopted in 1864 by the Geneva Convention. In all countries the care of the sick and wounded in war is primarily the duty of the state. In Great Britain, both army and navy have their own medical and nursing services. But the strain put on these organizations in time of war makes the help of civilian societies essential. The British Red Cross Society, which was founded in 1870 and incorporated in 1908, provides additional nurses, voluntary aid detachments of persons qualified to do the less skilled work of the hospitals, and skilled physicians and surgeons.

The society also provides convalescent and other hospitals, and the necessary supplies of hospital requisites, and also various comforts which fall outside the official provision. Its work is supplementary to and in support of the official military organization. The British Red Cross Society, under the war office scheme for the use of voluntary assistance to the war medical service, had by the end of 1919 passed and registered at the war office 3,141 Red Cross detachments, which had a total personnel of 91,116.

Under the conventions which govern the relations of nations in time of war, immunity is accorded to Red Cross workers, and the ambulances and hospitals, whether of the official military and naval organizations or of the Red Cross Societies, are protected by international law. One part of the work of Red Cross societies is the care of the interests of prisoners, and inquiries which cannot be made direct between warring governments can be made through the international organization of the Red Cross Societies. During the world war this work of tracing prisoners had its clearing-house in Switzerland, and it was through the same international agency that arrangements for the sending of parcels to prisoners were made.

The Red Cross societies of neutral states rendered the greatest possible service to prisoners of war, to aliens interned in enemy countries, and to aliens placed in difficult circumstances, and also cared for the refugees driven from their own homes by the war. In Great Britain the Red Cross, with the approval of the minister of pensions, has established depots for after-treatment of ex-soldiers. The local detachment are prepared to give assistance, secretarial and other, to local hospitals, local tuberculosis dispensaries, and infant welfare centres. See *Knights Templars*; *Nursing*; *S. John Ambulance Association*; *Voluntary Aid Detachment*; consult also the *Bulletins of the League of Red Cross Societies, Geneva*.

Red Deer (*Cervus elaphus*). Largest species of the deer family now found in Great Britain. It was formerly common in the forests throughout the British Isles, but now occurs wild chiefly in the highlands of Scotland and in the western islands, on Exmoor in England, and in co. Kerry in Ireland. The strain was greatly modified in the 19th century by the importation of stags from Germany and Austria. The stag stands about 4 ft. high at the withers, the hind being about 6 ins. shorter, and the weight of a fine specimen may attain 400 lb. The pelt is reddish brown, sometimes tinged with grey on the upper parts, and much lighter beneath, with a yellowish patch on the rump. The reddish tinge is peculiar to the summer months. The Irish variety has a white blaze on the forehead. The fawns are lighter in tone, and are thickly spotted with white.

The stags carry fine antlers, the number of branches or tines roughly indicating the age. In a good specimen the antlers may

measure a yard in length, and have an expanse between the two tips of about 40 ins. They are shed annually about March and at once begin to grow again, being covered with hairy skin, known as the "velvet," until they reach completion about September. During this time the stags are timid and harmless, but the completion of the growth of the antlers marks the beginning of the pairing season, when the stags fight furiously for the possession of the hinds. The stag is polygamous, and has even been known to collect a harem of fifty hinds. The fawns are usually born in May and June, only one being produced at a birth.

Red deer feed upon grass, young shoots, fungi, and beech nuts, and are said to eat the dry seaweed on the shores of some of the western islands of Scotland. They are also fond of licking rocks washed by the waves for the sake of the salt. They usually feed in the early morning and late in the afternoon, lying up in shady spots during the hotter hours. They have keen scent and are very wary, so that the deer stalker in the highlands has need of all the skill and patience he can bring to bear on his pursuit. See Antler; Deer; Deer-stalking.

Red Deer. Town of Alberta, Canada. It is an important junction on the C.P. and C.N. Rlys., and is on the Alberta Central Rly. It is 100 m. from Calgary, and stands in the centre of a farming district on the Red Deer river. Coal is mined in the vicinity, there are lumber mills and elevators, and the industries include quarrying and brickmaking. Pop. 2,100.

Reddish. Urban dist. of Lancashire, England. It is 4 m. from Manchester, with stations on the L. & N.W. and G.C. Rlys. There are cotton mills, and chemical and machinery works. Pop. 14,300.

Redditch. Market town and urban dist. of Worcestershire, England. It stands on the Arrow, 15 m.

from Birmingham, with a station on the Mid. Rly. There are manufactures of needles, pins, hooks, etc., also of motor-cars. The build-

ings, which include an institute, are modern, although there was a Cistercian abbey here in the Middle Ages. Pop. 15,500.

Red Eagle. Prussian order of knighthood. Instituted in 1705, and remodelled 1759, 1810, and

1832, it ranks after that of the Black Eagle. The badge is a Maltese cross with red crowned eagles in angles, and the ribbon is white with orange stripes.

Redeemer (Lat. *redimere*, to buy back). Term used as a synonym for Jesus Christ because of His work in redeeming the world from sin. See Incarnation; Jesus Christ.

Redeemer, HOLY. Greek order of knighthood. Is was instituted in 1833, and remodelled in 1863.



Red Eagle. Badge of the Prussian order



Redeemer. Badge of the Greek order

The badge is a white Maltese cross encircled by a green laurel wreath and surmounted by a crown. The ribbon is light blue with white borders.

Redemption. (Lat. *redimere*, to buy back).

Term used in theology for the work of Jesus Christ in redeeming the world from sin. See Atonement.

Redemption. In financial matters, the repayment of a loan after a certain time, and on stated terms. Municipalities often raise money by redeemable stock, as it is called, one condition being that at the end of a certain time the lender shall be repaid, sometimes with a small premium. Debenture stock issued by public companies is often redeemable.

Redemptorists (Lat. *redemptor*, redeemer). Roman Catholic religious congregation of priests and laymen. It was founded by S. Alfonso dei Liguori in 1732 at Scala, under the name of the Congregation of the Most Holy Redeemer. Its object is the evangelization of the poorer classes by means of missions, and of all classes by holding retreats. The usual monastic vows are taken by the members of the congregation, which has several houses in the British Isles. There is also a congregation of nuns of this order, who devote their lives to contemplation and intercessory prayer. They first came to England in 1879, and have a convent at Clapham Park, London. Each community consists of 33 professed nuns, in honour of the years of Our Lord's life on earth, and the habit worn is of red and blue.

Redesdale. District of Northumberland, England. It consists of the valley of the river Rede, or Reed, and extends for about 20 m. from the Scottish border to the N. Tyne at Reedsmouth. The dale forms one of the main routes between England and Scotland, and the men of Redesdale won notoriety as doughty fighters in many a border foray. Otterburn is at the S. end of the valley, in which are the Roman station of Bremium, and reservoirs for supplying Newcastle with water. Robin of Redesdale was the name taken by the leader of a rising in 1467.

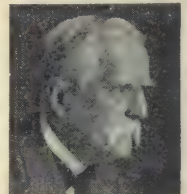
Redesdale, BARON. British title borne by the family of Freeman-Mitford. John Mitford, a Northumbrian landowner, had a son, John (1748-1830). Born Aug. 18, 1748, he became a barrister, and in 1788 M.P. for Beeralston. In 1793 he was made solicitor-



Earl of Redesdale, British author

general, in 1799 attorney-general, and in 1801 speaker of the House of Commons. From 1802, when he was made Baron Redesdale, to 1806, he was lord chancellor of Ireland. He took the additional name of Freeman, and died Jan. 16, 1830. His son and successor, John Thomas Freeman-Mitford (1805-86), an author and a keen defender of the Protestant faith, was made earl of Redesdale in 1877, but on his death, May 2, 1886, his titles became extinct. His estates passed to a kinsman, who became Baron Redesdale in 1902.

Redesdale, ALGERNON BERTRAM FREEMAN-MITFORD, BARON (1837-1916). British diplomatist and politician. Born Feb. 24, 1837, he was educated at Eton and Christ Church, Oxford, and entered the foreign office in 1858. Attached to the St. Petersburg embassy, 1863, he was sent to Peking, 1865, and Tokyo, 1866-70. He sat as a Conservative in the Commons from 1892-95, and in 1902 was created Baron Redesdale. He accompanied Prince Arthur of Connaught to Japan, 1906, and died on Aug. 17, 1916. Redesdale published an interesting volume of Memoirs in 1915.



Baron Redesdale, British diplomatist

Russell



Redditch. Seal of the urban district council

Redfern. Southern suburb of Sydney, New South Wales. An industrial district, it has railway and iron works, boot and tobacco factories. See Sydney.

Redfield, WILLIAM CHARLES (b. 1858). American politician. Born at Albany, New York, June 18, 1858, he was educated at Pittsfield, Mass., and entered the engineering profession. He was Democrat member of Congress for the 5th New York district, 1911-13, and was secretary of commerce in Wilson's cabinet, 1913-19. He published *The New Industrial Day*, in 1912.



W. C. Redfield,
American politician

Red Flag. Symbol of international socialism. Red has been traditionally recognized as the colour of social revolutionary movements in modern times, and in most countries the Red Flag, like the black flag of anarchism, is an accepted standard. The words of the socialist song, *The Red Flag*, are by Jim Connell, and have been set to the tunes of *The White Cockade*, Maryland, and a Beethoven air arranged by Granville Bantock.

Redgauntlet, A TALE OF THE EIGHTEENTH CENTURY. Nineteenth of the *Waverley Novels*. It abounds in scenes of abiding interest and charm, touched with the glamour of expiring Jacobitism, and told in part through the media of letters and journals. The period is 1766, and the scenes are laid in Cumberland and the Scottish borders of the Solway. Alan (or Saunders) Fairford recalls Scott's father; Alan Fairford is auto-



Redgauntlet. Lillias Redgauntlet, the heroine of Scott's novel. From an illustration by E. T. Parris

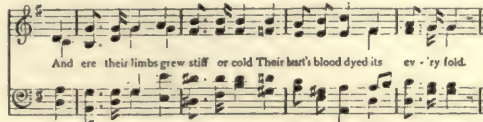
The Red Flag.

Air—"Maryland." Arranged by HUGH S. REBORTON.
(Copyright.)

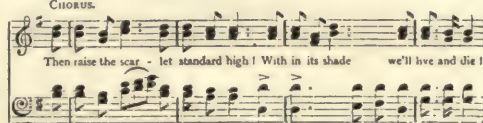
Words by JIM CONNELL



1. The people's flag is deep-red; it shrouds oft our martyr'd dead

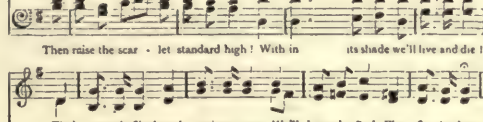


And ere their limbs grew stiff or cold Their hart's blood dyed its every fold.

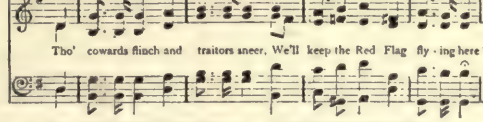


CHORUS.

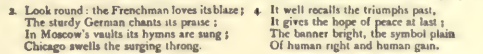
Then raise the scar - let standard high! With in its shade we'll live and die!



Then raise the scar - let standard high! With in its shade we'll live and die!



Tho' cowards flinch and traitors sneer, We'll keep the Red Flag flying here!



2. Look round: the Frenchman loves its blaze; 4. It well recalls the triumphs past,
The sturdy German chants its praise; It gives the hope of peace at last;
In Moscow's vaults its hymns are sung; The banner bright, the symbol plain
Chicago swells the surging throng. Of human right and human gain.

3. It waved above our infant might, 5. It suits to-day the weak and base;
When all ahead seemed dark as night; Whose minds are fixed on self and place,
It witnessed many a deed and vow, To cringe before the rich man's frowns,
We must not change its colour now. And haul the sacred emblem down.

6. With heads uncovered swear we all
To bear it onward till we fall;
Come dungeon dark or gallows grim,
This song shall be our parting hymn.

Words and music of the socialist song

By courtesy of the publishers, *Reformers' Bookstall, Limited, Glasgow*

biographical; Lillias Redgauntlet is a memory of the author's youth; the romantic Darsie Latimer is a portrait of Scott's friend, Will Clerk. Wandering Willie, the blind fiddler (whose weird Tale of the Redgauntlets fired the imagination of R. L. Stevenson, and is by many regarded as the finest short story in the language), Nanty Ewart, Peter Peebles, and the Quaker Geddeses are notable characters.

Redhill. Market town of Surrey,

England, part of the mun. borough of Reigate. It is 21 m. from London and is an important junction of the S.E. & C. and the L.B. & S.C. Rlys. The town takes its name from the red sand formerly dug on the common. Fuller's earth is obtained in the neighbourhood. The Philanthropic Society maintains a large reforma-

tory farm-school for boys here, and at Earlswood is an institution for mental defectives. Pop. 18,000.

Red Hill. Prehistoric mound of burnt earth, found especially in Essex. Scattered along estuary and tidal river margins, not more than 5 ft. above high-water mark, they are low, flat masses, varying in size from a few rods to several acres. Some hundreds are extant. An exploration committee appointed in 1906 spent four seasons in excavating typical examples, and presented reports to the Society of Antiquaries in 1908 and 1910. It was found that the loose burnt clay was sometimes intermingled to the extent of about 1½ p.c. with fragments of coarse earthenware called briquetage, comprising so-called firebars, pedestals, and T-pieces. Occasional Samian potsherds apparently date the mounds not later than the 1st century A.D. Fragments of charcoal, never exceeding 1 in. across, came from furze, broom, and the commoner forest trees.

Similar briquetage found in Lorraine and Belgium pertains to open earthenware furnaces, using



Redhill, Surrey. Cross roads in the centre of the town, looking up Station Road

brushwood fuel, for crystallising common salt from brine. Whether the Essex Red Hills are the débris of salt-works, kelp-works, or other industries, whether they mark the actual sites of the clay-burning, and what purpose, if any, was served by the burnt earth, are still under investigation.

Red Indian. Popular name for the American Indian. They were so called from the colour of the skin. See American Indian.

Redistribution. In politics, a change in the size and number of the constituencies returning members to parliament. It is usually made to meet the changes brought about by the movements of population. In the United Kingdom, the first great redistribution of seats was effected by the Reform Act of 1832, when a large number of small boroughs were deprived of the privilege of sending two members to parliament, and large places were given it. Time made a further less drastic distribution necessary in 1867, and again in 1884. The last redistribution was effected by the Reform Act of 1918, when the parliamentary representation was once more made to correspond more closely to the populations of the various areas, and the number of members was increased.

In a number of countries redistribution is brought about automatically. In Canada, for instance, the representation of Quebec in the House of Commons is fixed at 65 members, and the other provinces send numbers that bear the same proportion to 65 as their population does to that of Quebec, the change being made after every census. In France there are arrangements by which an arrondissement, if its population rises to over 100,000, sends another member to the Chamber of Deputies. See Commons, House of; Reform Act; Representation.

Redlands. City of California, U.S.A., in San Bernardino co. It is 70 m. by rly. E. of Los Angeles, and is served by the Southern Pacific and the Santa Fé Rlys. Picturesquely situated among mountains, it lies in one of the most important orange growing districts in the world. Bricks and lumber products are manufactured. Redlands is the seat of a university and contains a public library. It was incorporated in 1887. Pop. 9,600.

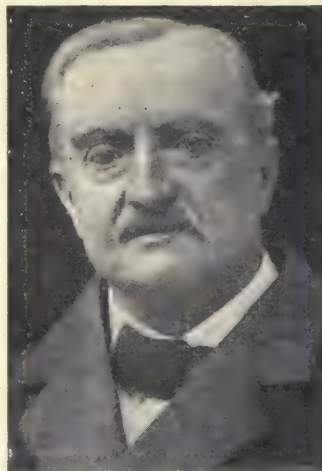
Red Lead OR MINIMUM. Scarlet oxide of lead. It is made by roasting finely divided white lead by means of the heat of a reverberatory furnace. The brightness of the colour depends in a great

measure on the care taken during this process, the heat requiring careful regulation and the mass being constantly stirred. Red lead is largely employed as a paint for metals and wood, in glass manufacture, as a cement for steam joints, and in the manufacture of storage batteries. Inferior red lead is sometimes adulterated with iron sesquioxide and red bole, but these substances can be distinguished from red lead by their insolubility when the powder is digested with warm dilute nitric acid to which a little sugar has been added.

Red-letter Day. Saint day or feast marked in the church calendar by red letters. Hence the term is commonly used for a day made memorable by some particularly desirable event.

Red Lion Square. Between Theobald's Road and Holborn, London, W.C. Built by Dr. Barebone (d. 1698), son of Praise God Barebone, on Red Lion Fields, it was named after Red Lion Inn, Holborn. Its residents have included Sharon Turner, Rossetti, Burne-Jones, and William Morris. Many of the houses have been rebuilt. St. John's Church, by J. L. Pearson, was built 1874-78.

Redmond, JOHN EDWARD (1851-1918). Irish politician. Son of William Archer Redmond, he belonged to a family of landowners



J. E. Redmond Russell

long associated with co. Wexford, both his father and his grandfather having sat in Parliament for Wexford borough. Educated by Jesuits at Clongowes, and at Trinity College, Dublin, John began life as a clerk in the House of Commons and became a barrister, but in 1881 he turned to a political career and

was returned as Nationalist M.P. for New Ross. His abilities as a speaker and his family connexions made him prominent in the party; he was sent to Australia to collect funds, and in 1887 he suffered a short imprisonment under the Crimes Act.

When the split in the Nationalist party occurred in 1891, he adhered to Parnell, and on his death became the leader of his followers in Parliament. After the election of 1892 these only numbered 9. He continued to criticise freely, but much of the bitterness of earlier years had disappeared, and on some points he was sympathetic with both the Liberal and the succeeding Unionist Government. In 1900, when the two sections of the Nationalist party united, he was chosen as their leader, and this position he retained until his death. In 1885 he was returned for N. Wexford, and from 1891 onward represented Waterford city.

Under Redmond's leadership the Nationalists in Parliament worked, as did the other parties, by constitutional means. He was a member of the Land Conference of 1904, and after the Liberals came into power in 1906 he obtained from them several measures for Ireland, although not yet Home Rule. He helped them with the Budget of 1909, and after the first election of 1910 his party held the balance of power in the House of Commons. He was in close touch with the Government in the steps taken to shackle the House of Lords, and he accepted warmly the Home Rule bill of 1912. In the two years during which this was the main excitement of political life, he showed a willingness for concessions to Ulster, was rather embarrassed by the enrolment of the Irish volunteers, and was a member of the abortive conference at Buckingham Palace.

But while in Parliament his authority was unquestioned, it was far otherwise in Ireland, and the growth of the Sinn Féin movement was a terrible blow to his power, his work, and his hopes, even though Home Rule in a suspended fashion became law in 1914. The divergence between him and the Sinn Féiners was widened when, on the outbreak of the Great War, Redmond promised the support of Ireland. He did something to encourage recruiting, but refused to join the Coalition Cabinet in 1915. In truth, he could no longer rely upon Ireland; another blow to him was the Irish rebellion of 1916. Meanwhile he followed his own line of policy, secured exemption for Ireland from conscription, and was

a member of the Dublin Convention; but before the triumph of Sinn Féin at the general election of 1918, he died, March 6, 1918.

Redmond's career as an Irish leader was a failure; the middle course he sought to steer was not acceptable to the majority of the nation, with whom he lost touch. But in Parliament he was a success. He was a finished speaker, almost an orator of the old school, and his knowledge of the forms and procedure of the House of Commons was profound. He married an Australian lady, Miss Johanna Dalton, and had a son and two daughters. The former, William Archer, became M.P. for Waterford in 1918, and served with the forces during the Great War. See J. Redmond, a Biographical Study in Irish Politics, L. G. Redmond-Howard, new ed. 1912; Life, W. B. Wells, 1919.

Redmond, WILLIAM HOBY KEARNEY (1861-1917). Irish politician. A son of W. A. Redmond



William Redmond,
Irish politician
Russell

and a younger brother of J.E. Redmond, he was educated by the Jesuits at Clongowes. He was intended for the army, and became lieutenant in the militia, but abandoned

that career for politics when Ireland was in a most excited condition. In 1882 he was put in prison for sharing in the land league movements, and his abilities soon brought him to the front. He was in Australia, collecting funds for the party, when he was returned to Parliament as Nationalist M.P. for Wexford borough. In 1885 he was returned for Fermanagh, and in 1892 for East Clare. Meanwhile, he had been again in prison, and had declared himself a follower of Parnell when the party was split in 1890, and to the end he remained

an active follower of his brother both in and out of Parliament.

At the outbreak of the Great War Redmond urged his countrymen to enlist, and in a short time, although over military age, he set an example by taking a commission in a service battalion of the Royal Irish regiment. He went with it to the front in 1915, and served with it for two years, making a marked impression by speeches delivered in Parliament on short visits home. On June 7, 1917, Major Redmond was hit while his men were making an attack near Wytshaete, and died the same day. Redmond was chiefly remarkable in Parliament for his witty and pointed interjections, but was also an able speaker. He married an Australian lady, Miss Eleanor Dalton, but he left no children. See Trench Pictures from France, with biographical introduction by E. M. Smith-Dampier, W. H. K. Redmond, 1917.

Redon. Town and seaport of France. In the dept. of Ille-et-Vilaine, it stands at the mouth of the Vilaine and on the canal between Brest and Nantes. The chief building is the Gothic church of S. Sauveur; its earliest part dates from the 12th century and it has a detached belfry. The Benedictine abbey, founded here about 820, was long a famous religious house. Pop. 7,000.

Redon, ODILON (1840-1916). French painter and lithographer. Born at Bordeaux, April 20, 1840, he worked in Gérôme's studio, and became known as an exhibitor of oil paintings and pastels, especially of flower subjects, from about 1882. His skilful lithographic work includes the albums *Dans le Rêve*, 1879; *A Edgar Poe*, 1882; *Homage à Goya*, 1885; *La Tentation de S. Antoine*, 1888. His painting, *Yeux Clos*, was acquired by the Luxembourg, and he executed several portraits of interest, especially of contemporary artists. His work is marked by lively imagination and skilful decorative effects. He died in Paris, July 6, 1916.

Redoubt (Ital. *ridotto*, shelter). Small enclosed defence work em-

ployed in conjunction with a line of infantry trenches and forming a strong point of resistance, even after the ordinary trenches have become untenable or been captured. It is essential that its occupants should be able to fire in all directions. If the enemy breaks through the line the redoubts should hold, provide rallying points where the troops from the trenches can collect, localise the effect of the enemy's success, and cover the supporting troops in their endeavours to recapture the position. It was formerly considered essential that redoubts should be built above ground. As they were thus very conspicuous, the modern arrangement is merely an enclosed group of trenches which can be concealed like ordinary fire trenches. Ample dugouts and trenches must be provided, and considerable use is made of obstacles. A notable example in the Great War was the Hohenzollern redoubt (*q.v.*). See Entrenchment; Fortification.

Redowa. Bohemian dance in triple time, somewhat resembling the mazurka. It became popular in the ballroom during the first half of the 19th century, but has now died out.

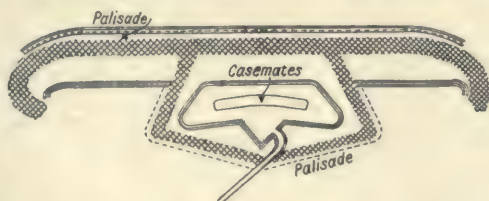
Redpoll (*Acanthis linaria*). British song-bird. Closely related to the linnet genus, it is found chiefly



Redpoll. Crimson-headed song-bird related to the linnet genus

W. S. Burridge, F.Z.S.

in the N. districts of Great Britain; also in Europe, Asia, and N. America. The plumage is reddish brown on the upper parts, with a deep crimson crown, pink breast, and white under parts. In habits and song it much resembles the linnet. It feeds upon insects and seeds. See Eggs, colour plate.



Redoubt. Sectional and ground plans of a typical infantry redoubt adapted to the configuration of the ground, as employed before the introduction of the trench system of warfare

By courtesy of John Murray

Redress. Relief or reparation. Redress of grievances was a common phrase during the struggle in England between king and parliament in the 17th century. The House of Commons then established the principle that redress of grievances by the king must precede a supply or a grant. See Charles I; Petition of Right.

Red River. Alternative name for the Hong-Kiang (*q.v.*), a river of S.E. Asia.

Red River. River of the U.S.A. The southernmost affluent of the Mississippi, it takes its rise near the E. boundary of New Mexico, and flows E. between Texas and Oklahoma and S.E. through Louisiana. Its chief tributary is the Washita. Some of its waters are carried to the Gulf of Mexico by bayous. It is about 1,500 m. long, and is navigable for 1,250 m. Vessels of 4 ft. draft can ascend to Shreveport, 330 m. up.

Red River. River of N. America. It rises within a few miles of the source of the Mississippi on the Height of Land in Minnesota, U.S.A., and flows S., then W., and finally N. between Dakota and Minnesota into Manitoba, where it enters Lake Winnipeg after a course of 700 m. It traverses an almost level plain formerly covered by Lake Agassiz; here wheat is produced in great quantities. The river is liable to floods, since the upper ice melts before the more northerly lower ice. It is navigable from Winnipeg to Grand Forks, and in flood time small steamers are able to navigate one of its branches through Lake Traverse to the Mississippi. Its length is 700 m.

Red River Settlement. Former colony in Canada, lying in the valley of the Red River, to the south of Lake Winnipeg, now part of the prov. of Manitoba. It was founded in 1811-12 by Thomas, 5th earl of Selkirk. By 1836 the Hudson's Bay Company had acquired full rights of control in the settlement, but when in 1869 the company's rights were transferred to the Dominion of Canada, there was strong opposition among the population of this district, largely of mixed French and half-breed blood. Under the presidency of Louis Riel (1844-85), a provisional government was set up to oppose annexation, but the rebellion was suppressed by a mixed Canadian and British force dispatched under command of Colonel Garnet Wolseley (*q.v.*), who entered Fort Garry in Aug., 1870.

Redroot. Alternative name for the plant more commonly known as blood root (*q.v.*).

Red Rot (*Fomes annosus*). Woody fungus of the natural order Polyporeae. It is very destructive to coniferous trees. The visible portion, the spore-bearing body, is evident on the trunks and exposed roots of infected trees as a thick rugged knob, of which the white portion is pitted with the openings of the spore-bearing tubes. The mycelium penetrates the woody tissues and breaks down the cells, reducing them to a soft condition.

Redruth. Market town and urban district of Cornwall, England. It is 9 m. from Truro and 63 from



Redruth. Seal of the urban district council

Plymouth, with a station on the G. W. Rly. It stands on a hill in the midst of a tin and copper mining district, and most of the industries are connected therewith. Horse and cattle fairs are held. The chief buildings are S. Uny's church, town hall, market house, science and art school, and museum. There is an exchange where the tin is sold. Near the town is Carn Brea, a rock 749 ft. high, on which are some remains traditionally associated with the Druids, and a ruined building known as Carn Brea Castle. In 1792 gas was first used here for lighting purposes. Pop. 10,800.

Reds. Term popularly applied to the Bolshevik faction of the Russian revolutionaries in contradistinction to the Whites. The latter comprised all the counter-revolutionary elements opposed to the Bolshevik Government, i.e. Cadets, Mensheviks, Right and Left Socialists, etc. The term originated



Redruth, Cornwall. Ruins of Carn Brea Castle

with the Red guards set up by the Bolsheviks. See Bolshevism; Russia; Soviet.

Red Sea. Arm of the Indian Ocean. It occupies the trough of a portion of the Great Rift Valley between Arabia and N.E. Africa, and extends from the isthmus of Suez, 1,200 m. to the S.E., to the Strait of Bab-el-Mandeb. At the N. end are two arms, the Gulfs of Suez and Akaba. From 100 to 200 m. wide, the coasts are fringed with coral reefs and lined by sandy deserts. Down the middle the channel is usually 3,000 ft. deep; the deep waters have a uniform temperature of 71° F., the surface waters vary from 77° F. in the N. to 84° F. in the S. Evaporation is continuous, and the hot humid air above the sea is depressing. Since the earliest times the Red Sea has been a marine highway, and has been used by steamers since the opening of the Suez Canal in 1869.

Owing to its position between Egypt and Arabia, the Red Sea was very familiar to the ancients. It is the most important seaway referred to in the Old Testament, and was crossed by the Israelites in their exodus from Egypt. The exact spot where they crossed the sea is purely a matter of surmise, but in all probability it was near Baal-Zephon. The story of their passage and the pursuit and destruction of Pharaoh's host is recounted in Exodus x, 19, and the place reached on the other side is identified as Ayun Musa (Fountains of Moses). The Red Sea was known to the Romans as Mare Rubrum, its two arms being called Heroöpoliticus Sinus and Aelanites Sinus, the Gulfs of Suez and Akaba respectively. Its historical associations are linked with those of Egypt (*q.v.*). The first historic civilization probably entered the land across the desert road from the Red Sea to Koptos. The Red Sea figured in all subsequent invasions, Assyrian, Syrian, Turkish, etc., and has always been a noted commercial highway. On Nov. 3, 1914, the British warship Minerva bombarded Akaba at the head of the gulf of that name, thus inaugurating the war against Turkey. See Aden; Africa; Arabia; Sinai; Suez Canal.

The Red Sea, or Suakin, province is a province of the Anglo-Egyptian Sudan. It borders the Red Sea and contains the dists. of Port Sudan, Suakin, and Tokar. On the whole it is an arid area; in Tokar dist. some cotton and durra are grown on irrigated areas. It is crossed by the rly. from Port Sudan, the capital, to Atbara Junction. Area, 27,200 sq. m. Pop. 34,702.

Redshank (*Tringa totanus*). British shore bird. It belongs to the plover family. The plumage is pale brown on the upper parts, with a tail barred with black and white, and whitish under parts. In winter the plumage tends towards grey. The legs and feet are bright orange red, and the body is about 12 ins. long. It is moderately common on the sandy shores of the E. counties of England, where it feeds upon crustaceans and marine worms. Its wider range includes Europe, Asia, and Africa.



Redshank. Birds of the plover family, common on the sandy eastern shores of Britain

W. S. Berridge, F.Z.S.

Red Spider (*Tetranychus telarius*). Eight-legged mite. It infests the inhabitants of the greenhouse



Red Spider. Common garden pest

generally, and, in the open air, particularly carnations, fuchsias, gladioli, and roses. The best greenhouse treatment is to fumigate the interior of the structure with sulphur. In the open garden the remedy is to spray or syringe with one of the following mixtures: (1) 1 lb. of flowers of sulphur and 2 lb. of fresh lime boiled in 4 gallons of water. Then add 1½ lb. of soft soap, and, before using, 3 more gallons of water. (2) The extract from 6 oz. of quassia chips, 4 oz. of soft soap, and half a pound of flowers of sulphur, well mixed, in 5 gallons of water. (3) Paraffin emulsion. See Spider.

Redstart (*Ruticilla phoenicurus*). Migratory song-bird. It is to be seen between April and Sept. in most districts in England, but is nowhere common. It is found in the N. and central regions of the Continent. The cock bird has bluish-grey plumage on the upper



Redstart. British song-bird

W. S. Berridge, F.Z.S.

parts, with black throat and bright bay under parts. The hen is reddish grey on the upper parts, with pale red breast and flanks and whitish throat. It is commonly found about ruins, and makes its nest in old walls. Its food consists of insects and grubs. See Bird; Nest.

Red Triangle, THE. Emblem of, and name popularly given to, the Young Men's Christian Association. The red triangle on black cloth was worn on the right sleeve of the Y.M.C.A. uniform in the Great War. A magazine of this title was established in the same

period. The huts for soldiers organized by the Y.M.C.A. were known as Red Triangle huts. See Young Men's Christian Association.

Reducing Agent. In chemistry, a substance which removes oxygen, chlorine, etc., from compounds. Such substances are hydrogen, carbon, aluminium, etc. The term is used in a wider sense for any substances which bring about conversion into other substances. Some compounds themselves act as reducing agents, e.g. stannous chloride, a compound much used in testing for salts of mercury. Sulphurous acid, ferrous sulphate, sodium thiosulphate, and alcohol have also special applications in chemistry as reducing agents. Reducing agents are indispensable in reactions taking place in solutions, and one of the chief is sulphuretted hydrogen, which reduces ferric salts to ferrous salts, arsenic acid to arsenious acid, chromates to chromic salts, and exerts its action on hypochlorites, nitrates, sulphites, and thiosulphates, with separation of sulphur. In analytical chemistry, the reducing gases of the Bunsen or blowpipe flame, borax, potassium cyanide, etc., are used in dry reactions. See Chemistry.

Reductio ad absurdum (Lat., reduction to an absurdity). In logic and mathematics, the demonstration of a proposition by proving the absurdity of that which contradicts it. Thus: two straight lines perpendicular to a third are parallel; if they were not, they would meet, and from the point where they met two perpendiculars to one and the same straight line could be drawn, which is absurd. See Logic.

Reduction. In arithmetic, term used for changing the denomination of a quantity without changing its value. Examples are the reduction of pounds, shillings, and pence to pence, or the reduction of separate fractions to a common denominator.

Reduction. In metallurgy, the liberation of a metal from its ore. Thus iron oxide is reduced in the blast furnace to iron. The process often requires more than one stage, e.g. copper sulphides are reduced by roasting to sulphates as the first stage in a complex series of operations directed to the production of the metal copper. See Furnace.

Red Water. Disease which affects cattle at grass. It occurs only in summer and winter, and is more frequent on high land which has never been cultivated. It is known in Scotland by the name of moor ill. The cause of red water is a minute parasite, similar to that which causes malaria in man, conveyed by the common cattle tick. So called from the red colour imparted to the animal's urine, it affects cattle of any age. To prevent the disease it is necessary merely to keep the cattle off the land for a year, and graze it with horses and sheep, which are not susceptible to the disease. See Cattle.

Red-water Tree (*Erythrophloeum guineense*) or SASSY TREE. Tall evergreen tree of the natural



Red-water Tree. Leaves and flower-heads of the West African tree

order Leguminosae. It is a native of W. Africa. It has small, yellow flowers in terminal clusters. When the tree is cut a red juice flows from the incision. The bark is said to be poisonous, and is used as an "ordeal" by the natives for testing the guilt or innocence of suspected persons. An allied species (*E. labouchei*) is the Ah-pill of Queensland and other parts of Australia. It has close-grained, hard, red wood—the hardest produced by Australia—which is used by the natives for making wommeras and spear-heads.

Redwing (*Turdus iliacus*). British song-bird. It is related to the thrush, which it greatly resembles in general appearance. It is a winter migrant from N. Europe, and as it feeds almost exclusively on insects, it often suffers great



Redwing. Song-bird closely related to the thrush

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privation in severe weather. Usually found in cultivated districts, it possesses a clear and loud song.

Redwood (*Sequoia gigantea*) OR WELLINGTONIA. Large evergreen tree of the natural order Pinaceae. A native of the mountains of California, it is one of the tallest of trees, attaining a height of over 320 ft., with a trunk diameter of 35 ft. The leaves are small, and like green scales, overlapping on the branches and twigs. The male flowers are single or several together at the ends of shoots; the female flowers at the tips of other shoots may be passed over as growth buds. The cones are

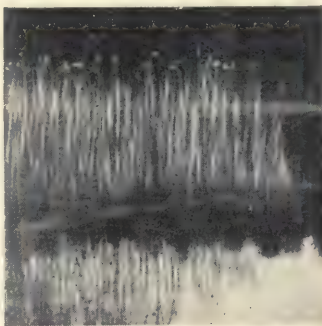


Redwood. Open cones and leaves of the giant evergreen

oval with blunt ends, from two to three and a half inches long, consisting of comparatively few four-pointed scales, with a depression in the middle of each. Reckoning the growth-rings as representing years, one specimen, of which a cross-section has been obtained, has been computed to have been over 3,000 years old.

Ree. Lough or lake of Ireland. Formed by the expansion of the river Shannon, it lies between the cos. of Roscommon, Longford, and Westmeath, and contains a number of small islets. It is 17 m. long and from 1 to 7 m. broad.

Reed (*Phragmites communis*). Large perennial herb of the natural order Gramineae. It is a native of Europe, Asia, Africa, America, and Australia, growing on the margins of lakes, streams, and up wet sea-cliffs. It is of very erect growth, the stout, round stems attaining a height of 10 to 15 ft., with broad, flat, rigid leaves. The flowers are gathered in a large, oval, purplish plume. The reed is the predominant plant in the fens of East



Reed. *Phragmites communis* growing on the margin of a pool

Anglia, and in the construction of the floating-fens which are found at the mouths of the Danube and in the Black Sea.

Reed. In music, the medium by which vibrations are set up in certain organ stops (oboe, tuba, etc.), and in some orchestral instruments, oboe, clarinet, bassoon, saxophone, etc.

The former are generally of metal, the latter of a kind of large grass which grows in S. Europe. A beating reed is one in which the edges of the tongue slightly overlap the slotted plate to which it is fastened. In the free reed the tongue passes through the opening. The harmonium and American organ are fitted with free reeds, without pipes; in other cases a pipe enhances the tone and resonance of the organ reed. In the orchestral instruments the tube is essential, the reed being merely the excitatory medium.

Reed. In weaving, a comb-like portion of the loom, consisting of vertical, parallel wires, through the dents or openings of which the warp threads are passed. The reed serves to separate the warp threads, and to beat home the weft, against which its wires are driven by the sley, or oscillator of the loom. See Loom; Weaving.

Reed, SIR EDWARD JAMES (1830-1906). British naval engineer. Born at Sheerness, Sept. 20, 1830, he entered the school of naval construction at Portsmouth. He became chief constructor of the navy, 1863, radically altering the methods of battleship design while holding the office. He resigned in 1870, and joined Sir Joseph Whitworth, afterwards designing battleships for several foreign navies. In 1880 he was made a K.C.B., and was a Liberal member of Parliament, 1880-95, and again, 1900-5, for Cardiff. He wrote *Our Ironclad Ships, 1869; The Stability of Ships, 1884*. He died Nov. 30, 1906.

Reed, EDWARD TENNYSON (b. 1860). British artist. Born March 27, 1860, the son of Sir E. J. Reed, he was educated at Harrow, and became an artist in black and



Sir E. J. Reed, British naval engineer



E. T. Reed. Unrecorded History. George Washington trying to tell a lie. Reduced from a characteristic drawing in *Punch*, by courtesy of the Proprietors

white. In July, 1889, he began to contribute to *Punch*, in 1890 joining its regular staff. His most popular drawings were the *Contrasts* series, 1890-91; *Prehistoric Peeps*, 1893; and a series of parliamentary caricatures, 1894-1912. *See Punch*.



Edward T. Reed,
British artist

Reed, THOMAS GERMAN (1817-88). British entertainer. Born at Bristol, June 27, 1817, he early acquired theatrical and musical experience, and from 1838-51 was musical director at the Haymarket Theatre, London. In 1855, with his wife, he started his popular dramatic entertainments, where light pieces by such writers as T. W. Robertson, F. C. Burnand, and W. S. Gilbert were performed, among his colleagues being John Parry and Corney Grain. These entertainments, first at the Gallery of Illustration, and later at St. George's Hall, were long a feature of London life, and were continued for a few years after Reed's death at Sheen, March 21, 1888.



T. German Reed,
British entertainer

Reedbuck. Species of antelope found in Central and S. Africa. It is nearly 3 ft. high at the shoulder, and has pale brown hair on the upper parts with dingy white beneath. The horns are only about 12 ins. long, and rise nearly straight from the forehead, bending slightly forward at the tips. These antelopes were formerly very common in the Transvaal, but have now become rather rare. They do not congregate in herds, and are always found in the neighbourhood of water, but never in marshes.

Reed-Bunting OR **REED-SPARROW** (*Emberiza schoeniclus*). Small European bird. Common in most

parts of Britain, it frequents rivers or swampy ground, where it builds its nest among the reeds or in small trees. It is gregarious in habit, and feeds chiefly

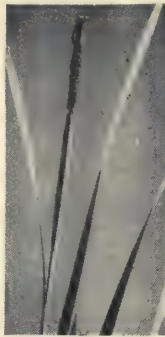


Reed-Bunting,
on a rush

on water-plants, insects, and small molluscs. The head and throat of the male are black; the back and

wings red-brown; the under parts and a band around the neck, white. The eggs are drab-coloured, streaked with black and dull purple. *See Nest*.

Reed-mace (*Typha latifolia*), CAT'S-TAIL OR CLUB-RUSH. Tall perennial herb of the natural order



Reed-mace. Leaves
and flower spike

Typhaceae. A native of Europe, N. and W. Asia, N. Africa, and N. America, it grows on the margins of lakes and rivers, and has a short, creeping rootstock from which the round erect stems rise to a height of 7 ft. The long, broad, nearly flat leaves may be 6 ft. long, with broad bases sheathing the stem. The female flowers are densely packed in a purple-brown spike or "mace" around the upper part of the stem, above which is the yellow "tail" of male flowers. There is a smaller and less common species (*T. angustifolia*) growing in pools and ditches, with narrower leaves and with the male and female spikes separated by a distinct interval of clear stem. It is often, but wrongly, styled bulrush (*q.v.*).

Reef. Barrier of rock or sand extending along the shore of an island or continent. It is more closely defined by the International Geographical Congress committee as a submarine elevation which

reaches within 11 fathoms of the surface. Such reefs are dangerous to shipping, and the most common are those formed by coral organisms. In mineralogy the word is used for gold-bearing veins of quartz rock. *See Coral*; *Coral Reef*.

Reefing. Operation of partly furling sail by taking in reefs. Sails have upon them a number of



Reefing. First reef taken in the fore-and-aft sail of a cutter or yawl short pieces of rope called reef points. When it is necessary to shorten sail by decreasing the area, these points are knotted around the foot of the sail. A vessel is close-reefed when all possible reefs have been made in her sails. Shaking out a reef is untying one course of reef knots and giving the sail a correspondingly greater area to the wind.

Reefton. Township of S. Island, New Zealand. It is 48 m. by rly. N. of Westport, and has gold and coal mines. Pop. 600.

Reel. Mechanism for winding yarn into hanks. A simple form consists of a skeleton hexagonal revolving frame over the arms of which the yarn is wound from bobbins or other holders. A hand warp-reel is used for measuring lengths of yarns for testing purposes, and an indicator carried upon the apparatus indicates the length wound. Power-driven reels are used in manufacturing operations, and are made long enough



Reedbuck. Female of the antelope formerly common in the Transvaal

W. S. Burridge, F.E.S.

to wind a number of hanks simultaneously. By imparting a reciprocating motion to the skeleton frame on which the hanks are wound the yarn can be laid in diagonals instead of in plain circles. Yarn so reeled is called cross-reeled, and cannot be unwound by hand like the ordinary straight reeling usual with hand-knitting wools. *See Spinning.*

Reel. Scottish national dance. It is performed by two or more couples, and called accordingly a foursome, sixsome, or eightsome reel. The music is provided by the bagpipes or fiddle; wanting these the dancers sing their accompaniment. It is a circular dance with quick, gliding movements, involving much whirling and a graceful forming of the figure eight, but it varies in different parts of the country. *See Dancing.*

Reeve (A.S. *geréfa*). Term applied to various public and private officials in England, chiefly in the Middle Ages. From Anglo-Saxon times the reeve was the steward or bailiff of an estate, who maintained order, collected dues, and supervised labour. Such was the reeve in Chaucer's *Canterbury Tales*. The word and office survive in the Scottish grieve. Dyke-reeves and field-reeves had special functions. In some coal mines a foreman or overseer is still called a reeve. Land confiscated by the crown was called reeve-land.

The word was also used of persons invested with certain public, especially magisterial, functions, as the sheriff (*q.v.*) or shire-reeve, the port-reeve (*q.v.*), and the borough-reeve. The manor-reeve was the elected representative of the villeins. The town-reeve was one of the four representatives of a town in the hundred court or

shire court. In Canada the title reeve is given to the president of a town or village council.

The word reeve is probably unconnected with German *graf*, a count. Other words identical in form are reeve, the female of the ruff (*q.v.*), and the nautical term to reeve (a rope), to pass it through a ring or hole.

Reeve, HENRY (1813-95). British journalist and author. Born at Norwich, Sept. 9, 1813, the son of Henry Reeve, a doctor of medicine, he was educated at the grammar school there. He spent some time in travel on the Continent, made the acquaintance of distinguished people, did some literary work, and in 1837 secured an appointment under the privy council. For many years he had a good deal to do with *The Times*, writing much for it on foreign affairs, for which his wide knowledge, especially of France and leading Frenchmen, fitted him. In 1855 he became editor of *The Edinburgh Review*, holding that position together with that of registrar of the privy council, to which he had been appointed in 1843. He died Oct. 21, 1895. Reeve is best known as the editor of the *Memoirs of Charles Greville*, his predecessor at the privy council. He also wrote *Royal and Republican France*, 1872. *See Memoirs and Letters*, J. K. Laughton, 1898.

Reeves, JOHN SIMS (1818-1900). British tenor singer. Born at Woolwich, Sept. 26, 1818, he sang the

baritone part of Rudolpho in *La Sonnambula* at Newcastle-upon-Tyne, 1839, and joined Macready's



John Sims Reeves,
British singer

Drury Lane company as tenor, 1841. In 1843 he studied in Paris, and later in Milan. He sang in opera in London in 1847, and entered upon his long career as an

oratorio singer in 1848, continuing to sing with great success in such works as *Judas Maccabaeus*, *The Messiah*, and *Elijah* until his farewell appearance in 1891. He was also famed as a ballad-singer, and continued to appear as such in later years. He died at Worthing, Oct. 25, 1900, one of the few notable tenor singers in English musical history. *See his Life and Recollections*, 1898.

Reeves, WILLIAM PEMBER (b. 1857). New Zealand politician. Born at Canterbury, New Zealand, Feb. 10, 1857, he was educated at Christ's College Grammar School, Christchurch, and was called to the bar of New Zealand. He turned to journalism and politics, became member of the parliament of New Zealand, 1887-96, and was minister of education, labour, and justice from 1891-96. He then became agent-general for the colony, and was its high commissioner, 1905-9. From 1908-20 he was director of the London School of Economics. His publications include *The Long White Cloud*, a *History of New Zealand*, 1898, and *State Experiments in Australia and New Zealand*, 1902.



W. Pember Reeves,
New Zealand politician
Elliott & Fry

Re-exports. Name given to goods imported into a country and then exported. These are classified separately and are usually exempted from import duties. *See Exports; Trade.*

Refectory (Lat. *refectorium*, from *reficere*, to restore). Term applied to a large hall in an abbey or kindred group of monastic buildings, where the monks or nuns took their meals. It was often a detached building, but in other cases was incorporated in the general ground-floor plan, being situated as a rule between the kitchen and the other offices of the establishment. *See Abbey; Monastery.*



Refectory in a monastic house; at the head of the hall is the prior or abbot; from a lectern on the right a monk is reading some edifying work while the others are at their meal

Referee. One to whom any matter or question is referred for decision. The term is applied in several connexions. In law it may mean a person known as an official referee; a medical practitioner appointed under the Workmen's Compensation Act, 1906; or a person appointed under the Coal Mines Act, 1911. There are also courts of referees dealing with unemployment insurance under part 2 of the National Insurance Act, 1911. In certain sports, a referee is the official who controls the game or contest while it is in progress. *See* Arbitration; Boxing; Football; Umpire.

Referee, THE. London Sunday newspaper devoted primarily to sport, music, and the drama. It first appeared Aug. 19, 1877, from the offices of The Weekly Dispatch, Ashton Dilke and Henry Sampson being joint proprietors. When Dilke died in 1883, his partner became sole proprietor. In Aug., 1921, the property was acquired by Robert Donald. Henry Sampson (1841-91), whose Arthurian pen-name, Pendragon, led the other regular contributors to assume similar pseudonyms—Caraus, Geraint, Dagonet, Galahad, Lancelot, etc.—was succeeded as editor by Richard Butler. The contributors have included G. R. Sims (Dagonet), writer of the Mustard and Cress page since its commencement; J. F. Nisbet, Martin Cobbett, David Christie Murray, A. E. T. Watson, H. Chance Newton, E. A. Morton, E. F. Pugh, Sydney Brookfield (killed in the Great War), J. N. Raphael, and S. R. Littlewood.

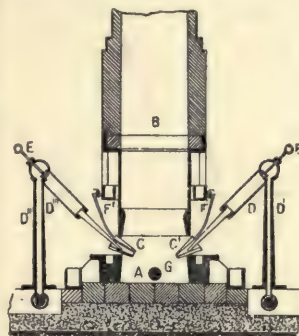
Referendum (Lat., to be carried back or referred). In politics, term applied to the reference of laws passed by the legislative authority, or of original legislative proposals, to the electors for acceptance or rejection. The taking of a referendum may be either compulsory, *e.g.* as to proposed changes in the constitution of a country, or permissive on the demand of a certain number of citizens.

The system is highly developed in Switzerland, where it is employed in all the cantons except Fribourg, and also since 1874 by the federal government. An interesting example of the referendum in practice was witnessed in the final decision of Switzerland to join the League of Nations, with the important reservation of the right to preserve perpetual neutrality by refusing passage to any foreign troops, even in the service of the league, over Swiss territory.

The federal government had

already decided at the close of 1919 in favour of joining the league, and in May, 1920, after a lengthy campaign of propaganda on both sides, the question was determined by the direct vote of the electors. The margin of votes in favour of joining was substantial, but by no means overwhelming—100,000 out of a total of 700,000—and in the case of the separate cantons it was still narrower; but the national verdict endorsed that of the federal government, and Switzerland was forthwith admitted to the League of Nations with full rights.

In the U.S.A. the referendum in various forms is a recognized part of the machinery of government in every state and municipality, and is being increasingly employed for purposes of general legislation, and to decide questions of local interest, as well as for constitutional matters. It is also employed in Australia, a noted instance being the referendum on



Refinery. Diagram showing iron refinery. *See* text

conscription under the Military Service Act of 1916, which resulted in a final adverse majority of 91,000 votes. The permissive form of referendum includes the origination of legislation which, if adopted by the direct vote of the electors, must be taken up by the legislature. *See* Initiative; Plebiscite.

Refinery (Lat. *re-*, intensive meaning; Eng. *fine*, to purify). Place where metals, sugar, and other substances are purified. Its use is to remove impurities from a more or less raw material, and thus to improve its quality. In metallurgy, practically every metal is subjected to a refining process. There comes always a stage in the extraction of the metal from its ores when, while nearly the whole of the gangue or earthy matter of the ore has been separated from it, there still remain traces or small portions of that earthy matter, or of foreign metals, sufficient to render it unsuitable for the chief

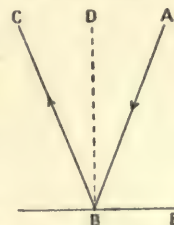
purposes for which it is intended. It is the aim of the refinery to remove such impurities.

The figure shows the working of a typical iron refinery. A is the hearth, B shaft, C, C' tuyères or air blast nozzles, D, D', D'', D''' air pipes. Air blast regulating valves are at E, E', and F, F' are water-cooling pipes to the tuyères. The refined molten metal is removed at G by a tap hole.

The term refinery in metallurgy has, however, long been particularly associated with the production of fine qualities of iron; while before the introduction of Bessemer steel the iron refinery was one of the most important, and an indispensable section of the iron-producing industry. Thus, in the production of sheet iron for the manufacture of tinned plates in S. Wales, the crude pig iron employed was subjected to an elaborate process of refining in, first, what was called a melting finery, and secondly, in charcoal fineries, the process being essentially one of puddling. An analogous system, first known as the Lancashire process, is still used in the U.S.A., while the pure Russian and Swedish irons and the fine qualities of Yorkshire iron known for generations under the names of Farnley, Bowling, and Lowmoor are still produced by the aid of the refinery. The Yorkshire refinery consists of a furnace hearth about 4 ft. long, 3 ft. 4 ins. wide, and 1 ft. 6 ins. deep, enclosed by water-cooled jackets, and provided with a tuyère through which air blast, at a high pressure, is introduced. *See* Iron; Metallurgy; Oil; Puddling; Sugar.

Reflection (Lat. *reflectere*, to bend back). In physics, general phenomenon occurring in all kinds of wave motion.

It is most noticeable in the case of light. If a beam of light be reduced to a theoretical ray it is reflected in one direction, and it is said to undergo regular reflection. The point where a ray of light strikes the reflecting surface is the point of incidence. A perpendicular to the reflecting surface through this point is called the normal; the angle the incident ray makes with this normal



Reflection. Diagram showing law of reflection. Ray of light ABC makes equal angles ABD, DBE with the perpendicular to the reflecting plane BE

is the angle of incidence; the angle the reflected ray makes with it is the angle of reflection. The laws of regular reflection from a square are as follows: (1) The incident ray, the normal to the surface, and the reflected ray are all in the same plane. (2) The angle of reflection is equal to the angle of incidence. Without the phenomenon of reflection bodies not luminous in themselves would be invisible. *See Optics; Refraction.*

Reflections on the Revolution in France. Short title of Burke's Essay published in Nov., 1790. The full title is *Reflections on the Revolution in France, and on the proceedings in certain societies in London relative to that event.* It attracted much attention, and in a few years 30,000 copies had been sold. Its author was lauded by George III, as well as by many of humbler station. Burke unhesitatingly condemned the Revolution. He denounced the injustices and excesses committed in France, and wrote the memorable passage about Marie Antoinette's beauty and misfortune. It was answered by Thomas Paine's *Rights of Man* and James Mackintosh's *Vindiciae Gallicae*.

Reflex Action. Muscular action which is the result of an afferent impulse, i.e. an impulse originating in a stimulus external to the body and conveyed by a nerve to a part of the central nervous system, which then sets in motion the muscles necessary to produce the action. For instance, if the skin be pricked or touched with something hot, an impulse is carried by the nerve which has been stimulated to a nerve centre, and from this another impulse is sent down to the appropriate muscles, causing them to withdraw the limb from the source of pain.

Other instances of reflex action are the watering of the eye and the movements of the eyelids when a speck of dust enters the eye; the contraction of the pupil when a strong light falls upon it; and the pouring out of saliva or watering of the mouth which occurs at the smell or sight of food. A true reflex action is independent of the will and may occur in states of unconsciousness, as, for instance, the drawing away of the leg if the sole of a sleeping person be tickled. Nerve centres through which reflex actions are carried out exist in the brain, the spinal cord, and the sympathetic nervous system. *See Brain; Nerve.*

Reform (Lat. *re-*, again; *formare*, to form). Literally, to restore or form again. It is used for any change which is in the direction of

improvement, whether it is reform of a church, a school, or a domestic establishment. In politics it has come to be used for the process of changing, generally in the direction of bettering, the condition of the people or the constitution of a country by constitutional means as opposed to revolution, which uses violent means. Reform is specially associated with the progressive parties, as in the old Liberal watchword of peace, retrenchment, and reform. *See Liberal; Politics; Radical; Revolution.*

Reform Acts. In British history, name given to the series of Acts reforming parliamentary franchise and the composition of parliament, and designed to secure an adequate expression of the popular will in government. Formally described as Representation of the People Acts, these measures are the Acts of 1832, 1867, 1884-85, and 1918. In effect they have raised the ratio of voters per 100 of population from 3·3 after the first, to 15·5 after the third, and to 48·2 in 1918; and the House of Commons from 658 members in 1832 to 670 in 1885, and 707 in 1918.

For years before the introduction of Russell's first bill (March, 1831) a growing movement had demanded drastic parliamentary reform. The notorious constituency of Old Sarum returned two members for its heap of ruins; Manchester and Birmingham, with rapidly increasing industrial populations, were unrepresented.

Russell's first bill was dropped in April and, reintroduced, was rejected by the Lords, Sept. 21. In Dec. he introduced a new bill which passed the Commons in March, 1832, but was rejected by the Lords on May 7. Earl Grey and his cabinet resigned, and public feeling against the wreckers of the expected reforms ran high. Backed by the king's assurance of the

creation of new peers to ensure passage, the Whigs resumed power and the bill passed on June 4. The county franchise was given to occupants of lands and tenements at annual rent of not less than £50, the borough franchise to occupants of houses or shops of £10 yearly value. Fifty-six English boroughs were disfranchised, 30 had membership reduced to one; 22 boroughs were created with two members, and 20 with one apiece.

Abortive attempts at further reforms were made by Russell, 1854, Disraeli, 1859, Palmerston, 1860, and Gladstone, 1866. But in 1867 Disraeli carried through the second Reform Bill. Borough franchise was extended to all householders rated for poor-relief, and to lodgers occupying lodgings of annual value £10; the county vote to persons holding leasehold and copyhold of £5, and to occupiers of £12 rateable value. This increased the electorate from 1,353,000 to 2,243,000. Redistributions were also effected, and supplementary Acts for Scotland and Ireland were passed in 1868.

Gladstone's, or the third Reform Act, was passed in 1884, followed by a Redistribution of Seats Act in 1885. This measure added some 2½ millions to the register. It made uniform the householder and lodger franchise throughout the United Kingdom, created 33 new boroughs, increased the representation of several large centres, and gave Scotland 12 additional seats.

But the Act of 1918 was perhaps the most far-reaching, increasing the electorate by some 8,000,000, and admitting a measure of woman suffrage to the extent of about 6,000,000. The franchise was given to all men over 21 years with a six months' residence qualification, and to women over 30 years, who are either local government electors or the wives of such electors. No elector could vote for more than two constituencies, and all general election polls must be held on the same day. The redistribution of seats added 31 to England, and two each to Scotland, Ireland, and Wales, university representation (with a system of proportional representation) being increased to 15. The basis was taken as one member to every 70,000 of pop. in Great Britain and (by separate Act) to 43,000 in Ireland. The total electorate of the British Isles was thus brought to a figure over 21½ millions. The Government of Ireland Act, 1920, providing for two separate parliaments, modified the representation of Ireland under the 1918 Act. *See Commons, House of; Home Rule; Representation.*



Reflex Action. Method of producing the muscular action by striking the leg just below the knee-cap

THE REFORMATION AND ITS EFFECTS

A. D. Innes, M.A., Author, *Cranmer and the English Reformation*

In addition to the companion article on the Renaissance, those on Calvinism; Lutheranism; Papacy; and Protestantism may be consulted; also the biographies of Calvin; Hus; Knox; Luther; Wycliffe, and other Reformers. See also England; Germany; Scotland, and other historical accounts; also Huguenots; Indulgence

The Reformation is the name given to the great religious revolution or reconstruction of Western Christendom which took place during the 16th century, issuing in the division of all Christendom into three sections: the self-styled "Orthodox" or Greek Church of the East, which had already, for many centuries, been parted from the West; the self-styled Catholic Church of Rome, acknowledging the supreme authority of the papacy; and thirdly, the whole group of Christian bodies which, whether they claimed or did not claim for themselves the title of Catholic, all stood outside both the Greek and the Roman Churches. These, being in agreement at least on the one point of repudiating the papal authority, presently received the common designation of "Protestant," although that term in its primary significance embraced only the adherents of one particular confession. The latter bodies claimed for themselves individually the name of Reformed Churches.

State of the Medieval Church

Periodically, during the Middle Ages, there was a demand for reformation; but that meant, not a revision of Christian beliefs, but reformation within the Church, the ecclesiastical body, reformation of system, of morals, of methods. Revision of claims to authority, and proposals for revision of doctrine were vigorously suppressed. Such demands were raised, not only by the laity, but among the clergy themselves. The distinctive feature of the 16th century Reformation was its insistence upon a revision of doctrine, which involved not merely reformation but reconstruction, a complete change in the relations of clergy and laity, which had not been contemplated by earlier reforming movements.

In the medieval Church, disciplinary movements had been for the most part of ecclesiastical origin, but such came in waves. The last had exhausted itself by the beginning of the 14th century. From that time various causes combined to set ecclesiastical authorities in antagonism to reforming movements. The long captivity of the papacy at Avignon shattered the ideal of Gregory VII and the great popes of the 12th and 13th centuries. An even

deadlier blow was dealt to the spiritual character of the papacy by the Great Schism. The slight and partial recovery which followed the council of Constance was itself followed by the appalling relapse, which culminated with the pontificate of Alexander VI. The need for reform at the close of the 15th century was making itself universally felt, and a vigorous reforming movement was actively at work; but it had not yet reached the supreme authority.

Spiritual and Secular Rivalry

The spiritual authority, therefore, had been without a spiritual reality for generations. To the people it had proffered not living faith, but dead formulas, not an inward religion, but outward observance; not worship of the Divine, but cultivation of the Divine favour through the medium of purchasable clerical favour; with the natural consequence that respect for the Church was at a very low ebb.

Other forces also were at work. Politically there was an immemorial rivalry between the authority of the Church and the authority of secular princes; secular princes were generally willing to resent papal assertions of authority which challenged their own, and to assert their authority over clerics in their own dominions in despite of ecclesiastical thunders. The vast accumulations of wealth in the hands of prelates and ecclesiastical bodies were a constant grievance of the laity. The clergy were by profession guardians of morality; their lapses from morality were therefore condemned with all the greater severity. Moreover, it was palpable that the clergy in the higher ranks concerned themselves at least as much with politics and essentially worldly affairs as with their pastoral functions.

There was nothing novel or unprecedented about these conditions. But in the past the ecclesiastical claims to authority had been most resolutely asserted in days when the ecclesiastical champions were conspicuously great men, or at least men with great ideals; whereas at the beginning of the 16th century the Church had reached its nadir. It was at its worst in respect of everything that had ever excited against it the denunciations of moralists and the

jealousy of lay magnates, while in addition to all this, the obscurantism which had once been in some sort a source of strength had become a cause of weakness.

The revival of letters was making it impossible to accept the limitations which the Church had imposed upon legitimate inquiry; and the inference that the Church's pronouncements, instead of being infallible, were born sometimes of ignorance, and sometimes of a fear of truth, was becoming irresistible.

The actual occasion of revolution was the action on the part of Leo X which roused Luther to challenge the papacy. That challenge raised the whole question of authority in the most acute form. The whole position of the medieval Church rested on the assumption that the Church was the Divinely appointed intermediary between God and man. The whole Lutheran or Protestant position assumes direct personal relations between God and the individual man.

Lutheranism undertook to challenge doctrines which were generally accepted, ostensibly on the ground that they were in contradiction to the teaching of Scripture; in fact they were in the main precisely the doctrines which involved the recognition of the priesthood as a necessary channel of grace. The challenge, therefore, however sincerely inspired by enthusiasm for truth and righteousness, was in effect anti-papal and anti-clerical; and therefore it attached to itself, or allied itself with, all the anti-papal and anti-clerical elements, which in themselves had no concern at all with doctrine.

Right of Private Judgement

The logical outcome of the Protestant position was the assertion of the right of private judgement; but that was not in theory the claim which Protestantism made. In theory it repudiated the authority of the Church, but substituted for it the authority of Scripture. Its weakness lay in this, that Scripture needs interpretation; and Protestantism provided no infallible interpreter. Protestantism, therefore, inevitably broke up into sects, each group offering its own interpretation, and pronouncing all antagonistic interpretation to be false and anti-Scriptural. In a world accustomed for centuries to recognize a single indisputable or unquestionable authority, the recognition of the right of private judgement appeared simply to spell chaos. Whatever might be the case in theory, Protestantism was in practice driven back upon the position that the state was the arbiter. Every state

of necessity sought to establish its own form of Church, whether the Church so established remained a part of the Roman organization or not; and each state claimed at its own will to prohibit or concede a limited toleration to other forms of Church government, doctrines, and observances. The broad line of demarcation was that between the states which in popular language were described as Catholic and Protestant, the states whose governments continued to recognize, and those which repudiated, the authority of the Church of Rome.

Revolt of Luther and Wycliffe

As the epoch of the Reformation is said to open in 1517 with Luther's decisive challenge to the papacy, so it is to be reckoned as closing with the dissolution, in 1563, of the council of Trent, which definitively established the limits of Roman Catholicism. Luther was the champion of revolt against the doctrinal authority of Rome, and his distinction is that he was the first to head a revolt which succeeded. The seed which came to harvest in the 16th century had been sown in the 14th by John Wycliffe in England. After Wycliffe's death his doctrines were stringently suppressed in England, though the persistence of concealed Lollardy kept the soil in some degree of readiness for further developments. Moreover, the doctrines that were taught at Oxford found their way to the university of Prague, where with some modification they were adopted by John Hus (*q.v.*). There were other universities besides Prague where the teachings of Hus were germinating a hundred years after his death.

The revolution which Luther initiated followed varying lines of development in the various countries of Europe during the 46 years which we have called the epoch of the Reformation. By the end of that time Spain and Italy were secured for the papacy; England, Scotland, and Scandinavia were secured for Protestantism; in France it was still uncertain whether Catholics and Protestants would settle down to mutual toleration, the Huguenots being in a minority, but still far too strong to be easily crushed by force. The crowd of German states were severally recognized as Catholic or Protestant, according to the predilections of their rulers; even the ecclesiastical principalities were not all given to the Catholics.

But in the main and speaking roughly, Protestant states predominated in north Germany and Catholic in the south. In Poland,

Bohemia, and Hungary it was still uncertain which of the creeds would conquer in the end. The Protestant folk of the northern Netherlands were still under the yoke of Spain.

We may turn now to the narrative, beginning with Germany, where the gage of battle was definitely flung down.

In 1517 Pope Leo X, in want of money, proposed to procure supplies by the sale of indulgences on a scale and at a price hitherto without precedent. The sale of indulgences was not a new thing; it had before been made the subject of protest, but the scruples of princes had been quieted by a percentage of the profits.

But Luther had come very definitely to the conclusion that neither priests nor popes could grant pardons, the forgiveness of sins being the function of God alone. He posted on the church door at Wittenberg a series of theses denouncing the doctrine of indulgences, and the Elector of Saxony supported him by refusing permission to the commissioners for the sale of indulgences to enter Saxony. Luther now set about the hopeless task of fortifying his position so as to make his argument convincing to those who were certain not to be convinced; in so doing, he found himself proving to himself that reconciliation was impossible, and in effect prepared himself, not for the defence of a particular thesis, but for open war.

Position of the Protestants

At the diet of Worms he clearly proclaimed the Protestant position: that popes and councils may err, but the truth which he found in Scripture could not err, and by that he would stand at all costs. That declaration was in fact the assertion of his own right and his own duty to follow his own judgement and to obey his own conscience. If that was his right and his duty, it follows that it is no less the right and duty of every individual. The logical conclusion was universal toleration for all opinions conscientiously held, but Protestantism did not for generations to come rise to the fullness of that conception.

Germany was divided in opinion. Personal interests, contempt for the papacy, anti-clerical sentiment, admiration for Luther's courage, genuine moral and religious enthusiasm, all combined in varying degrees to bring together a body of support for Luther so powerful that any attempt to crush it would obviously have involved Germany in civil war, of which no one could have foretold the issue. The edict

issued against him by the diet became practically a dead letter. A diet held at Spire in 1526 agreed upon a compromise, which virtually left each of the princes to settle matters as he chose within his own dominion; when another diet there, 1529, cancelled the compromise and resuscitated the edict of Worms, the new edict was met by the Lutherans with a defiant protest which gave to them and to the cause of the Reformation the name of Protestant; and this was followed up by the issuing of the formal confession of faith in 1530, known as the Confession of Augsburg (*q.v.*). But this was not enough, and the princes who adopted the Augsburg Confession united themselves in the defensive armed league of Schmalkalden.

The Council of Trent

The predilections of Charles V (*q.v.*) were antagonistic to Protestantism as being subversive of authority in general, and a palpable obstacle to one of his great political aims, the establishment of the emperor's personal authority in the empire as supreme. But Charles could not afford to plunge into a doubtful civil war, and the years passed uneasily, with civil war perpetually threatening. The prevalent view, which everyone professed more or less ardently to support, was that the whole question ought to be dealt with and brought to a final settlement by a general council of the Church.

But unfortunately every party concerned wanted such a council to be held under conditions which would ensure that particular party's own predominance therein, and by no means under conditions which promised the predominance to someone else. Pending the summoning of a council, a conference was held at Ratisbon between representatives of the various religious parties, in 1541, but no basis of agreement was reached. At last, under pressure from the emperor, Pope Paul III summoned a council to be held at Trent in 1545, but the terms under which it assembled made it a foregone conclusion that its decisions would be wholly papalist; practically Protestants declined to recognize its oecumenical character. Its decisive activities were deferred till 1562.

Meanwhile in Germany the contest had reached a settlement on its political side, for Luther had done much to avert an armed conflict. Almost immediately after his death in 1546 Charles found an opportunity for attacking and crushing the league of Schmalkalden (*q.v.*). In 1547 his personal relations with the pope were

exceedingly strained; therefore he took matters into his own hands, and issued on his own authority the terms of a compromise known as the interim of Augsburg, which was satisfactory to no one. A reaction set in, and in 1552 the emperor without warning found himself almost deprived of authority, and was obliged to submit to the treaty of Passau, which in 1555 was confirmed by the pacification of Augsburg, intended to establish a permanent religious peace throughout Germany, having as its basis the principles that the religion in each state should be the religion of its prince, and that toleration should be granted to the Lutheran worship. For various reasons the settlement did not prove permanent, but it secured peace for more than 60 years.

Reformation in Switzerland

In Germany the struggle had practically been one between the adherents of the Lutheran confession and the adherents of the papal authority on questions of religion. But it had been bound up with a constitutional resistance to the emperor's political design for centralising the control of the empire by establishing his own supremacy. It had been further complicated by the traditional antagonism between pope and emperor as to the spheres of their respective authorities. Only latterly it was touched also by a non-Lutheran form of Protestantism which predominated outside of Germany. The fountain-head of this other form of Protestantism was in Switzerland. The Swiss school predominated in France, in the Netherlands, and in Scotland. In England the Reformation was a peculiar and distinctive compromise in which the dominating factors were political.

The Swiss reformation was set in motion by Zwingli, at Zürich. Zwingli, like Luther, successfully challenged the doctrine of indulgences and the attempt to sell them. Like Luther, he attacked abuses, and made the Scriptures the criterion of truth. But his interpretations of Scripture were not identical with those of Luther; on the question of the Eucharist the two held fundamentally divergent views. Luther, rejecting the Roman doctrine of transubstantiation, substituted for it the doctrine of consubstantiation, affirming the real presence, though in another form. Zwingli denied the real presence altogether, claiming that the Lord's Supper was purely commemorative. Zwingli was tolerant, willing to recognize as legitimate much wider diversi-

ties of opinion than Luther, who denounced him almost as energetically as he denounced the pope.

Reforming refugees from other countries sought asylum in Switzerland. Among these was John Calvin, who, in 1536, issued from Basel the Institutes, which at once laid down the doctrines of the Calvinistic theology, and the principles of the form of Church government known as Presbyterianism. Calvin, without accepting consubstantiation, admitted in his doctrine of the Eucharist a more mystical view than the frank rationalism of Zwingli. But he was still further removed than was Luther from the Zwinglian attitude of toleration; his creed was more rigid than that of either Zwingli or Luther, and more completely irreconcilable with mere modifications of Roman doctrines, or the Roman organization.

When Luther defied the papacy, Lutheran and Zwinglian doctrines at once began to make way in other countries, though the secular authorities were generally disposed to suppress them with more or less vigour. Jealousy of the clergy, however, was common among the nobility. In France the crown, after a brief hesitation, definitely took the side of orthodoxy against innovation. But many of the nobility followed the opposite course; they derived, moreover, a certain strength from the obvious fact that Francis, despite his title of the Most Christian king, was quite ready to ally himself with heretics, or even with infidels, if by doing so he could serve his own political purposes. Then Calvinism, originated by a Frenchman, appealed to the French mind. Calvinism lent itself to political organization, and the Huguenots, as the French reformers were called, became a very powerful body.

Growth of Political Parties

The adherents of the rival faiths assumed the character of political parties. The Catholics themselves were largely anti-papal in the days of the council of Trent, at least in the sense of claiming a great degree of national independence; and though Catholicism was definitely predominant, it by no means held a decisive mastery. For 35 years to come there was a continuous struggle, which was only brought to a conclusion when the legitimate Huguenot claimant of the crown purchased Catholic support by renouncing his Protestantism, but kept faith with his former co-religionists by issuing the edict of Nantes in 1598.

In Scotland the movement, which, as in France, drew its inspiration from Geneva, was vigorous among the commons. The crown, closely allied to the Church in its struggle with the nobles, encouraged persecution; the nobles, angrily hostile towards the churchmen, leaned strongly to the side of the Reformation, and finally won a complete victory with the aid of Queen Elizabeth in 1560. In the Northern Netherlands Calvinism took a firm grip in spite of the persecuting policy of Charles V and his successor, Philip II of Spain; but the great struggle of those provinces for religious liberty was still to come.

Henry VIII and England

In England, before the appearance of Luther in Germany, a reforming movement had already made great progress under the guidance of scholars and humanists, not without encouragement from leading ecclesiastics, all acutely conscious of the need of raising the moral and intellectual standards, both of clergy and laity. But the Lutheran propaganda, and the anarchist propaganda, by which, in spite of Luther's own denunciations, it was accompanied, made reactionaries of the reforming leaders themselves. There was among most of them no disposition to question the spiritual authority of the Church, or of the papacy, no thought of challenging received doctrines, though much demand for the abolition of obviously corrupt customs. But circumstances developed in the mind of Henry VIII a determination to repudiate the authority of the papacy, because he found that it stood in the way of his personal desires. Since the pope was not to be persuaded to annul his marriage with Catherine of Aragon, the pope was to be penalised by the unqualified refusal to recognize in England any papal authority whatever, and by the cutting off of all English contributions to the papal coffers.

The English clergy were not disinclined to claim national independence of the Roman episcopate. Having failed to take their stand on the side of ecclesiastical against secular authority, they found themselves powerless to resist the king when he went on to assert his own personal supremacy as head of the Church in England, or when he proceeded, with the assent of parliament, to enormous confiscations of ecclesiastical property, and the complete suppression of monastic establishments. In all this the king had the support of every anti-clerical element in the

country; and since not a few of his most useful instruments were men with leanings towards Lutheran or Zwinglian doctrines, and the friendship of German Lutherans was for political reasons desirable, the king, without admitting such doctrines, was willing to suffer some small latitude of opinion, but nothing more.

During the brief reign of Edward VI, the government gave free play to the reformers; by vigorous ecclesiastical legislation it imposed religious formulas, Protestant in character, and definitely ranged itself upon the side of Protestantism; though the dominating influences gave the formulas an extremely comprehensive character, sufficiently indefinite to cover very wide diversities of opinion. In the next reign Queen Mary endeavoured to recall the country to its old allegiance to Rome. She defeated her own ends by resorting to the fatal method of persecution. The legitimacy of her half-sister and successor Elizabeth could be maintained only on the hypothesis that the papal pronouncement on the so-called divorce of Catherine of Aragon was invalid. Elizabeth therefore was compelled to repudiate the papal authority, and it had already become clear that such repudiation was incompatible with the retention by the Church of those Roman tenets which the various Protestant schools had agreed in rejecting. The popular hostility to Rome, confirmed and greatly extended by the Marian persecution, weighed in the same scale; and with the accession of Elizabeth England was definitely ranged on the Protestant side.

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Reformatory School. State-aided institution at which offenders between the ages of 12 and 19 years are lodged, and receive industrial training to equip them for useful citizenship.

Until towards the end of the 18th century, the law in Great Britain had no consideration for juvenile delinquents. Children who infringed it were punished

like their elders, and prison influences were allowed to complete the ruin that thieves' seminaries or the streets had begun. At the beginning of the 19th century careful estimates revealed that in London alone 6,000 boys and girls were expert professional thieves; more than half the criminal population had adopted that mode of life before the age of 15; and many children under 14 years had already undergone two or three sentences.

Meanwhile, the conviction was slowly growing that these child offenders were the victims of



Reform Club, London. House in Pall Mall of the famous Liberal club

their surroundings, and that not punishment but rescue was the remedy. Private charity was invoked to establish homes for their reformation, and the secretary of state was induced to grant conditional pardons to young convicts whilst resident in these shelters. The Philanthropic Society's farm school at Redhill, founded in 1788, was perhaps the earliest of reformatory homes. In 1833 state action followed; the gaol at Parkhurst was converted into a reformatory prison, where youthful offenders were subjected to a modified discipline with good results.

But yet juvenile crime remained rife, and a popular movement, fostered by the humane teachings of Charles Dickens, insisted upon further reforms. The Reformatory School Act of 1854, which was the outcome, gave official recognition to such training centres by empowering criminal courts to send offenders under 16 years old to a reformatory school, after a preliminary term of imprisonment. A later statute abolished the last-named part of

the sentence, and juvenile delinquents are now sent direct to the reformatory.

The use of these means of reclamation is regulated by the Children Act, 1908. Young persons between the ages of 12 and 16, who are convicted of any offence punishable by penal servitude or imprisonment, may be committed to a certified reformatory school for not less than three nor more than five years, but in any case must not be detained beyond their 19th birthday. In practice, the majority of juveniles so committed are over 14 years of age.

Established in wholesome surroundings, these schools provide a useful training in various handicrafts and trades, and reformation is sought through discipline, self-respect, and *esprit de corps*. The direct results attained are excellent, the percentage of failures being small.

The proper conduct of reformatories is assured by a visiting staff of inspectors from the Home Office, upon whose certificate depends the Treasury grant by which the schools are maintained. See Borstal System; Industrial School.

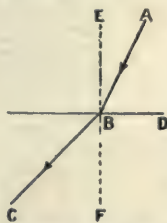
Reform Club. London club. It was founded in 1836, and was long the chief club of the Liberal party, and the rival of its neighbour, the Carlton. The house is a fine building, 104 Pall Mall, built by Sir Charles Barry. Although still a Liberal centre, its place as the chief social centre of the party has been taken by the National Liberal Club (*q.v.*). The Manchester Reform Club, founded in 1866, is an important centre of Liberalism in the north of England.

Reformed Churches. Term used generally for all Protestant bodies which have separated from the Church of Rome and adopted the principles of the Reformation. It is more definitely applied to denominations in Germany and elsewhere, which separated from the Lutherans and followed the teaching and church organization of Calvin and Zwingli. They are strongly predestinarian in doctrine, reject Luther's theory of consubstantiation in the Eucharist, are presbyterian in church government, and adopt a simple and extemporaneous form of public worship. In Germany they are often known as the Evangelical Churches.

Reformed Episcopal Church. Small Protestant denomination, originating in a secession from the Episcopal Church of America. It originated in 1873, when Bishop Cummins and seven other clergymen left the American Church on

the ground that it was not sufficiently Protestant to meet their views. They objected to the doctrines of the real presence, baptismal regeneration, the eucharistic sacrifice, the power of the priesthood, and the necessity for episcopal ordination. Cummins consecrated other bishops, and a few local churches were started. The movement found some adherents in England, where there is a presiding bishop. At the present day it is said to have about 10,000 adherents and about 100 ministers.

Refraction. In optics, a phenomenon caused when waves of light from one medium pass into



Refraction. Diagram showing the law of refraction. See text

another medium. Usually when light waves traverse two media, the waves have their directions changed or refracted. The phenomenon is of importance, for it is due to refraction that mirages exist, that the day appears

longer than it is, etc. A common example of the effect of refraction is seen when a walking-stick is partly submerged in water. The stick appears to be broken at the surface of the water, due to the different indices of refraction of air and water. In the figure AB is a ray of light refracted at B along the line BC. BD is the plane between the two media, and EBF the perpendicular at that plane. By the laws of refraction the refracted ray makes with the normal an angle whose trigonometrical sine bears a constant ratio, for any two particular media, to the sine of the angle the incident ray makes with the normal. Certain kinds of crystals are remarkable for their power of giving two refracted rays, i.e. double refraction. See Crystallography; Light; Optics.

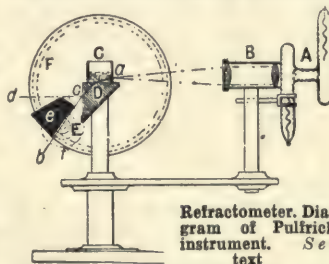
Refractometer. Instrument which assumes various forms for determining the refractive index of solids, liquids, or gases.

In a Pulfrich refractometer for determining the refractive index of liquids, of which only a small quantity is available, the principle of total reflection is used. The figure shows diagrammatically the principle of such a refractometer. A is a Geissler tube and the source of light, concentrated by lenses in B on to a glass cylinder C, which contains a liquid whose refractive index is being tested. D is a prism, a and b refracted ray, bcd angle

read by telescope E, mounted on a graduated circular scale F; e is a shadow area to left of ray, f bright area to right. Calculation of angle bcd gives refractive index. In an interference refractometer, the index is determined by the use of interference fringes, and so allows of the measurement of the difference of path of two interfering rays. The instrument may be employed in different forms to measure very minute linear distances where great accuracy is required.

Refractory Materials. Materials which strongly resist the destructive or disintegrating action of fire or high temperatures generally. In its broadest sense this term thus covers a great variety of substances, including metals used for the manufacture of articles which have to stand the action of fire or great heat in other forms, as pots and pans, kettles, boilers, and so on. An ore which can be smelted only with great difficulty, and by the aid of very high temperatures, is said to be highly refractory. The term refractory has, however, during recent years been used in the technical sense as a specific term for the earthen, clays, sands, stone, and other non-metallic substances employed for the manufacture of pottery, bricks, crucibles, ovens, kilns, retorts, and the linings of metallurgical and other forms of furnaces. These substances have been of great industrial importance from the very earliest times. They are the raw materials of the potter and of the brickmaker.

In metallurgy, with the great advances which have been made in recent years in the production and



Refractometer. Diagram of Pulfrich instrument. See text

employment of high temperatures, researches in refractory materials have become of vital importance. The results attainable in a metallurgical operation may depend absolutely on the character of the refractory materials used in constructing the furnace or converter.

In preparing refractories for metallurgical purposes three important conditions have to be kept in mind; the possible chemical reactions between the ores, fluxes, fuel, and metal, and the

material of the furnace lining; the dead weights tending to crush the refractory; and the mechanical actions of heavy masses of ore, fuel, and flux moving over the surfaces of the refractory. The great aim to be kept in view is to lengthen the life of the refractory. In some operations the life is represented by only one or two heats, after which the refractory material must be renewed or repaired; frequently a crucible can only be used once; but the life of the lining of a great blast furnace must extend to many months for its profitable working.

The natural substances mostly used in the preparation of refractories comprise the clays—common clay, china clay or kaolin, and fire clay; many varieties of sands; Dinas rock, ganister, bauxite, graphite (plumbago), lime, magnesite, dolomite or magnesian limestone, magnesite, chromite, steatite, flints, and other forms of quartz, marl, and asbestos. Some of these may be used in their natural condition, but mostly they have to be subjected to treatment, frequently of an elaborate character, comprising grinding, sieving, washing, or chemical treatment, subsiding, filter pressing, drying, and firing. Of artificial preparations the most important are carborundum and the forms of compressed carbon represented by the electrodes of electric furnaces and are lamps. See Furnace.

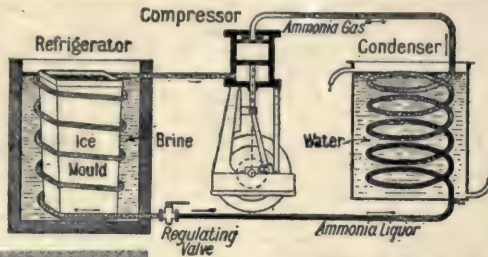
Refrigeration. Application of cold for the preservation of food. The principle of the preservation of food by the abstraction of heat is old. Cold caverns, cellars, and, where available, snow, have always been used for the purpose. The freezing mixture of ice and salt was known in the 17th century. In 1834 Jacob Perkins invented a machine which included in simple form the principles of the modern refrigerator: the evaporator, the compressor, the condenser, and the refrigerator, and since that time many types have been invented.

The principal kinds are: (1) The air machine, in which the cooling process is accomplished by the alternate compression and expansion of air.

(2) The absorption machine, where the process is accomplished by the alternate vaporisation and condensation of some substance. While the condensed vapour is re-evaporating, it takes up heat from the bodies round it, thus accomplishing refrigeration. The commonest type of absorption machine is that in which ammonia dissolved in water is the medium.

(3) The vapour compression machine is one which acts by the

mechanical compression of a condensable vapour. Any liquid which can be alternately liquefied and vaporised serves, and the substances used are water, sulphuric ether, sulphurous acid, ammonia, and carbonic acid, the last three being the favourite media. Refrigeration on a large scale is chiefly carried out by machines of this kind. The objects to be cooled by the use of



e.g. the weaving and silk manufactures brought over by the Protestant refugees from France at the revocation of the edict of Nantes, 1685. During the Great War numbers of Belgian refugees made their way

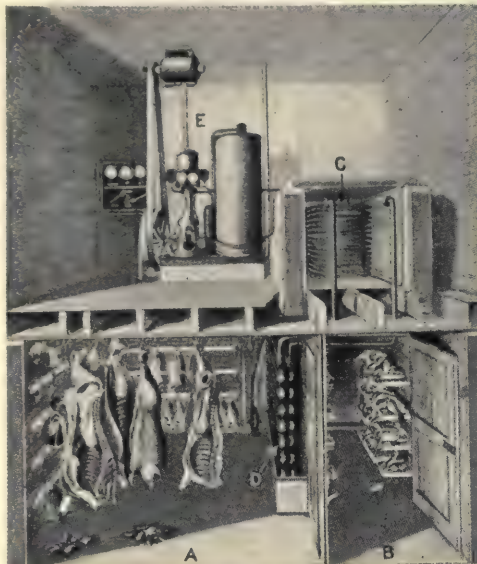
to England, when committees were formed to look after their welfare and large sums of money raised for their assistance.

Refuse. Literally, that which is rejected or worthless. It refers especially to the waste that results from factories and houses, and its disposal is one of the great problems with which those responsible for the health of crowded areas have to deal.

The problem of the quick removal and destruction of kitchen waste is a difficult one to solve, largely owing to the varied character of the refuse. Animal and vegetable matter, paper, ashes, tins, rags, bottles, etc., have to be disposed of promptly and regularly in order to avoid offensive odours, risk of contamination and spread of diseases, etc. Three general methods have been used: (1) dumping on land and partly burning in the open; (2) dumping at sea; and (3) destruction in special furnaces. The first two are impracticable in any large community, and the third is now the only method which is at once cleanly and comparatively inexpensive.

Modern refuse is burnt in high temperature destructors. These consist of a number of grates upon which the refuse is burned, with ash pits beneath, set usually in pairs back to back with a common chimney. Special chambers or other devices are provided for trapping the fine dust or ashes of combustion, which would otherwise rush up the chimney and be scattered over the neighbourhood. Forced draught is used, and tipping platforms provided for supplying rubbish to the destructors. The temperature of the destructors is between 1,500° and 2,000° F., and the refuse is converted into water vapour, carbon dioxide, and nitrogen, together with an incombustible mixture of ashes, metal, and fused glass. The fused residue known as clinker is ground down for pavements, for building mortar, etc. Modern refuse destructors not only provide steam for their own draught, but are valuable sources of power supply.

Efforts have been made with more or less success to sort refuse,



Refrigeration. Plan of small installation of cold storage plant. A. Meat store. B. Fish store. C. Wrought-iron brine-filled tank with expansion coil. D. Brine coils. E. Electric motor. Top, right, diagram of system

refrigerating plant must of course be placed in a container of some insulating material. This material must have the minimum of conductivity, must be damp-resisting, and must be sanitary. Charcoal, hair felt, pumice, silicate cotton (the slag from iron foundries), cork slabs, timber, and paper are used for the walls, and the flooring is usually of ashes, asphalt, or concrete.

From 1830 onward there was a considerable import into the United Kingdom of natural ice, at first from America, and then from Norway, but the trade ceased with the outbreak of war in 1914. During the War the necessity of transporting and preserving large quantities of food for the armed forces, and for the civil population, led to an enormous extension of cold storage works, and the production of refrigerating plant for insulated rolling stock, and cargo ships.

The introduction of refrigerating plant has developed the Australian, New Zealand, and Argentine frozen and chilled meat trade, and has facilitated the transport of butter,

and for the store in which cheese is ripened; in sugar refineries for obtaining sugar from molasses residues; in margarine factories for the solidification of the emulsion; and in many other industries for kindred purposes.

The first meat refrigerating plant was established at Darling Harbour, Sydney, N.S.W., in 1861, and the trial shipment to England in 1876, in s.s. *Norham*, which had been fitted with an ammonia compression plant for the purpose. The trade from Buenos Aires began in the same year. See *Cold Storage; Distilling; Ice-Making*; consult also *The Mechanical Production of Cold*, Sir J. A. Ewing, 1921; *Cold Storage and Ice Making*, B. Springett, 1921.

Refugee. Term applied to one who, for political or reasons other than criminal, is obliged to fly from his country and take refuge elsewhere. Religious persecutions in the 17th, and political ones in the 18th and 19th centuries, sent many refugees to England, and the country greatly benefited by the arts and crafts they introduced,

many ingredients being sold separately to contractors, or to extract before burning the greases and fertilising substances. *See* Destructor; Scavenger; consult also Removal and Disposal of Town Refuse, W. H. Maxwell, 1898; Refuse Disposal and Power Production, W. F. Goodrich, 1904.

Regal. Small portable organ, dating from about 1460, and having one or more stops of beating-reeds. The origin of the name is uncertain, but it is probably derived from Lat. *regula*, rule, as the instrument was originally used to regulate or keep in order the singing of the monks. It was sometimes made to fold up, with an exterior resembling a book, hence the term Bible Regal. Amongst the instruments possessed by Henry VIII were several pairs of double (or full compass) regals, and of single (or short compass) regals. *See* Organ.

Regalia (Lat. *regalis*, royal). Emblems belonging to the sovereign as such. The regalia of the sovereign of Great Britain and Ireland include S. Edward's crown, the imperial crown, S. Edward's staff and sceptre, the royal orb, a pair of bracelets or armillae, a ring, a mantle and other garments, a pair of spurs, the ampulla or golden eagle—a receptacle for the anointing oil—and a spoon for the oil. Others are the five swords, two of state, one of temporal justice, one of spiritual justice, and the curtana. There are also crowns and staves for the queen consort. All are used at a coronation. They are kept in the Tower of London, and most of them were made for the coronation of Charles II. The regalia of Scotland, crown, sword, and sceptre, are kept in Edinburgh Castle. The word is also used for certain rights belonging to the sovereign as lord of the land, these being relics of feudal times. *See* Coronation; Crown, colour plate; Feudalism; Tower of London; consult also The English Regalia, C. J. H. Davenport, 1897.

Regan. Character in Shakespeare's King Lear. One of the two elder daughters of the king, and the wife of the duke of Cornwall, she joins her sister Goneril in unfilial conduct to their father, and encourages her husband to put out the eyes of the king's faithful servant, the earl of Gloucester, with whose illegitimate son, Edmund, she falls in love. In the end she dies poisoned by Goneril, her rival for the love of Edmund. *See* King Lear.

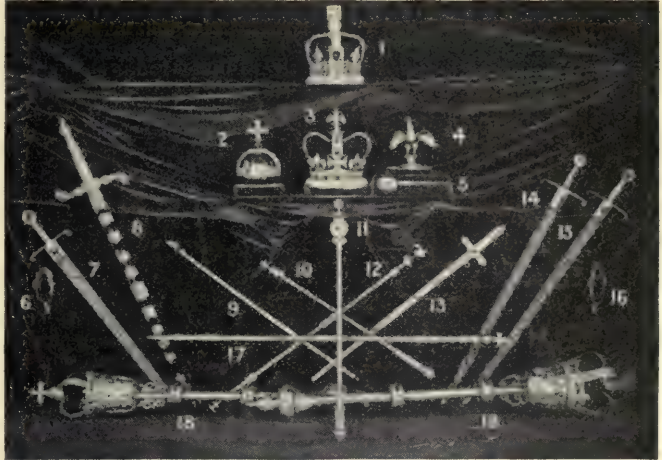
Regatta (old Ital., contention). Sporting fixture on the water, consisting of races between single skiffs, rowing boats, or sailing yachts. The term was introduced

from Venice, where it was applied to an annual boat race, in 1775, in which year the first English regatta was held on the Thames. The premier river regatta takes place in July at Henley, while Cowes at regatta time in August is the Mecca of the yachting world. During the summer months a large number of other regattas of varying importance are held on rivers or round the coast. At the smaller regattas the programme is not confined to "best boats," and may include aquatic sports. In all cases the social element is a prominent feature of the entertainment provided for onlookers. *See* Henley; Rowing.

Regelation. Term first used by Faraday for a phenomenon of freezing. When pursuing his investigations in heat at the Royal Institution in 1850 Faraday observed that, if two pieces of ice be

cient to make the snow melt, which it must do before it can be formed into a ball. But if the temperature be somewhere near the freezing point, such pressure as can be given by the hands will suffice to melt the particles of snow where they are squeezed together, thus forming a little water which, as soon as the pressure is released, freezes and binds the snow into a ball. A demonstration of regelation is to take a block of ice and pass over it a loop of wire or cord, attaching a weight below to the cord or wire. The cord or wire will cut its way through the block, but as fast as it does so the block will freeze solid again. Regelation also largely explains the formation of glaciers which begin as snow. *See* Glacier.

Regeneration (rebirth). Name given to the Divine act or process by which the life and character of



Regalia of the British Sovereign. 1. Imperial crown. 2. Orb. 3. S. Edward's crown. 4. Ampulla. 5. Anointing spoon. 8. Spur. 7. Curtana. 8. Sword of state. 9. Queen's sceptre, with dove. 10. Queen consort's sceptre. 11. Imperial sceptre, with cross. 12. King's sceptre, with dove. 13. Sword of offering. 14. Sword of temporal justice. 15. Sword of spiritual justice. 16. Spur. 17. S. Edward's staff. 18. Maces

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pressed firmly together and then the pressure removed, the pieces will unite into a solid block. What happened was that the blocks melted slightly where they were in contact under pressure, but as soon as the pressure was released the water thus formed froze again, uniting the pieces together. That ice will melt under simple pressure has since been frequently proved, and serves to explain many common phenomena.

Every schoolboy, in countries where snow occurs, knows that it is sometimes easier to make a snowball than at others. If the snow be very cold and dry it is not easy to make a firm ball, because the pressure of the hands is not suffi-

a man are changed when we become a Christian. Regeneration is the correlative of conversion. Conversion represents the human side, i.e. what the man himself does through repentance and contrition; regeneration represents the Divine side, i.e. what God does for the man by the gift of grace and the Holy Spirit to make the conversion effective. Many attempts have been made to define and explain the process of regeneration more exactly.

A number of theologians have maintained that regeneration confers upon man a new spiritual faculty, hitherto unpossessed, which enables him to grasp and assimilate Divine truth. Others hold

that it wakes into life a religious consciousness which has hitherto been dormant. Others again say that it alters the balance of forces in a man's life and enables the higher and more spiritual side of his nature to obtain the mastery over the lower and more carnal. Something analogous to the Christian conception of regeneration is found in other religions. The doctrine of the "twice-born man" plays a great part in the religions of India, for instance. In the Greek mystery religions the conception of regeneration is of very great importance. The Hermetic literature declares that "regeneration is the end of all revelation." See Incarnation.

Regeneration. The power of reproducing by new growth parts of the body that have been lost by accident or amputation. It is observable chiefly in the lower orders of animals, in which there is greater liability to loss from the attacks of enemies. Trembley's celebrated experiments with the fresh-water hydra nearly 200 years ago demonstrated that, if cut across, it repaired the injury by the basal portion reproducing the lost mouth and tentacles, and the upper half produced a new base. If divided vertically, the left side produced a new right half, and the original right a new left. Sponges and sea-anemones have a similar power of repair, and the common starfish frequently affords evidence of having lost one or more of its rays, which it has reproduced on a smaller scale. The brittle-stars are so called on account of their readiness to part with their rays on the slightest alarm, as though conscious that the lost members can be reproduced with facility—as they are.

In insects this power is not commonly exhibited, but the stick-insects, which are very liable to

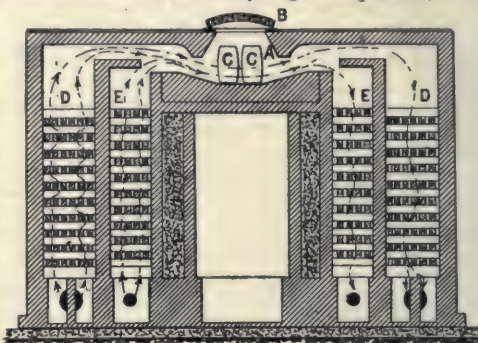
lose their long legs, reproduce them when they moult; at first they are bud-like, but with each successive ecdysis the new limb becomes larger. In this they follow a similar course to the higher crustacea, which frequently lose limbs—often voluntarily, as a means of escape from danger—and gradually replace them when they moult. Regeneration is equally common among molluscs, especially the sea-snails (gastropods), which, when active, are only partly protected by the shell, and the head or hinder part of the foot may be bitten off by fish. The mollusc is able to renew the lost parts. Injuries to the shell are repaired by the mantle which secreted it originally.

Among vertebrates the phenomenon is much less common, but fishes have been known to reproduce lost fins, and the batrachians limbs and tails. Spallanzani barbarously amputated all the legs and the tail of a salamander no fewer than six times, and they were reproduced each time. Bonnet repeating the experiment succeeded eight times with one salamander. The slow-worm, the gecko, and the common lizard readily part with their tails if these are held, and the stump develops a new tail, but it is several years before the new part equals that which has been lost.

There is something of the same nature in plants. A spruce whose leading shoot has been destroyed will replace it by the upward growth of a bud that was intended to develop into a lateral branch. When a limb has been broken off a large tree by a gale the bark will grow over and protect the wounded part, which may later continue its growth from resting buds. A cutting of a plant will seek to restore its lost base by throwing out roots. See Biology; Botany; Insects; Life; Man; consult also Lectures on Plant Physiology, L. Jost, Eng. trans. R. J. H. Gibson 1907.

Regenerative Furnace. Name given to a type of furnace invented by Sir William Siemens for utilising the heat of the burnt products. In a furnace employed for the smelting of metals or ores, the products of combustion of the fuels used, whether solid, liquid, or gaseous,

may issue from the furnace when they have done their primary work, at a very high temperature. In



Regenerative Furnace used for production of crucible cast steel. A. Furnace. B. Cover. C. C. Crucibles. D. D. Air heating regenerators. E. E. Gas heating regenerators. Regenerators on left are heating air and gas; those on right are being heated by hot waste gas

addition, they may still contain a considerable proportion of unburnt fuel gas, this being notably so in the case of the blast furnace when working on pig iron.

It is the object of a regenerative furnace to recover and utilise as much as possible of this escaping heat or waste fuel, and thus to reduce the fuel cost of any particular operation. This object is secured to a large extent by causing the escaping gases to heat fresh air or fresh gas, as it passes on its way into the furnace. The waste gas or heat is then said to be regenerated. This principle is applied in a variety of ways. In one, the waste gas passes over one surface of pipe, or is burnt in contact with that surface, while the in-going fresh air or gas traverses the other side of the pipe and in doing so picks up heat transmitted through the wall of the pipe. See Cowper Stove; Furnace; Metallurgy; Whitwell Stove.

Regensburg. German name for the city known better by its French form, Ratisbon (*q.v.*).

Regent (from Lat. *regere*, to rule). One who rules temporarily for a sovereign. A regency is necessitated by the minority, mental or physical incapacity, or absence of the sovereign, or by the infancy of the heir to the throne. Sometimes a council acts as regent. The first regent of England was William Marshal, earl of Pembroke, at the beginning of the reign of Henry III. The most famous regent of Scotland was James Stuart, earl of Murray or Moray, who was appointed after the abdication of Mary Queen of Scots at Lochleven in 1567. When George III, in his old age, was declared incapable of ruling, the prince of Wales became prince regent.



Regeneration. Spider crab, with left pincer leg being reproduced after loss. Top, slow-worm reproducing lost tail, seen on extreme right

Regent's Canal. English canal within the co. of London. It was constructed in 1812-20 by J. Nash, and named after the then prince regent, afterwards George IV. The E. end is N. of the Thames, opposite the Surrey Commercial Docks; it goes through the N. of Regent's Park to join the Grand Junction Canal in Paddington.

Regent's Park. London park. Covering 472 acres, in the bor. of Marylebone, between St. John's Wood and Camden Town, it contains the gardens of the Zoological, Botanic, and Toxophilite societies. There is an artificial lake of 22 acres, and the Regent's Canals skirts the N. side. On the W. side are Regent's Park College and S. Dunstan's Hostel for Blind Soldiers. Bedford College for Women is in the S. S. Katharine's Royal Collegiate Hospital was removed to the E. side from its original site near the Tower, 1825-29.

Deriving its name from the prince regent, afterwards George IV, and once part of the ancient manor of Tyburn, Regent's Park occupies the site of old Marylebone Park, later called Marylebone Farm and Fields. Under an Act of Parliament, 1811, it was laid out in 1812 by James Morgan from designs by John Nash, is crown property, and was opened to the public in 1838. During the Great War the headquarters of the army post-office were set up here.

Regent Street. London thoroughfare. It runs from Waterloo Place, Pall Mall, and passing Piccadilly (formerly Regent) Circus and Oxford Circus, finishes at Langham Place. One of London's great shopping centres, it was made, in 1813-20, from designs by John Nash to connect Carlton House (*q.v.*) with Regent's Park



Regent's Park. Plan of the London park, opened to the public in 1838

Based upon the Ordnance Survey Map with the sanction of the Controller of H.M. Stationery Office

and the house which was to be built there or on Primrose Hill for the prince regent. At No: 215, between Maddox Street and Conduit Street, was the office of Fraser's Magazine. See London; Piccadilly Circus; Polytechnic.

Reger, Max (1873-1916). German composer. Born at Brand, Bavaria, March 19, 1873, he was a prolific composer and of some importance as a follower of the Brahms tradition in the Germanschool, but the complexity of much of his work hinders its ready appreciation. His organ fantasies and fugues, and his violin and piano concertos are among his most important compositions, which include chamber music, many songs and piano works. He died at Jena, May 12, 1916.

Reggio di Calabria. Southernmost prov. of

the Italian mainland, in Calabria. It is almost surrounded by the Mediterranean Sea, and has an area of 1,219 sq. m. A promontory with a central ridge, a spur of the Apennines, it rises in Aspromonte (*q.v.*) to nearly 9,000 ft. The region is subject to seismic disturbances, but is on the whole fertile, producing chestnuts, oil, wine, silk. Coal is mined. Scilla, held by the British, 1806-8, is famous in the legend of Scylla and Charybdis (*q.v.*). Pop. 469,000.

Reggio di Calabria. City of Italy, capital of the prov. of Reggio di Calabria. The ancient Regium Julium, it stands on the strait of Messina, 8 m. S.E. of the city of Messina and 248 m. by rly. S.S.E. of Naples. Always subject to earthquakes, it has several times been destroyed, notably in 91 B.C., in



Max Reger,
German composer



Regent Street. The Quadrant



Reggio di Calabria, Italy. The Corso Garibaldi

1783, and on the last occasion in Dec., 1908, when the shock was followed by a tidal wave and 30,000 people perished. Every building suffered damage, and those left standing had to be demolished. There is a trade in perfumes, silk, terra-cotta, oil, dried fruits, etc. Reggio was founded by Greeks about 720 B.C., and became a Roman colony in the 3rd century B.C. Pop., in 1907, 40,000.

Reggio Emilia. Prov. of N. Italy, in Emilia. It slopes from the Tuscan Apennines to the Po valley, and has an area of 885 sq. m. Mountainous in the S., its culminating point is Mt. Cusna, alt. 6,420 ft. It is otherwise a fertile plain producing rice, wheat, vines, fruit, olives, and chestnuts. There are copper, iron, and sulphur mines, and all are worked. The chief manufactures include porcelain, glass, and silk. Pop. 326,000.

Reggio Emilia. Walled city of Italy, capital of the province of Reggio Emilia. The ancient Regium Lepidi, it stands on a small affluent of the Po, 38 m. by rly. N.W. of Bologna. A fine city, with broad arcaded streets, it has a cathedral founded in the 12th century and rebuilt in the 15th and 16th centuries. The church of Madonna della Ghiara is a beautiful Renaissance domed structure dating from 1597. There are Renaissance palaces, and the house where Ariosto was born. The centre of an agricultural district, it exports cheese, rears silkworms, and manufactures textiles, brooms, and leather goods. Founded in 187 B.C. by M. Aem. Lepidus, when he built the Via Aemilia, it flourished under the Romans, and became a bishopric in 450. In medieval times the city was an independent republic, passing under the control of the Este family in 1409. Pop. 75,000.

Regiam Majestatem. Name given to a collection of the ancient laws of Scotland. It is said to have been compiled between 1124-53 at the instance of David I. Its authenticity is doubtful, and the book is an almost literal copy of Glanvill's *Tractatus de Legibus*, written in the reign of Henry II.

Regicide (Lat. *rex*, king; *caedere*, to kill). Literally, one who kills a king. It is specially used, however, for those who were re-

sponsible for the death of Charles I in 1649. Of the 150 members of the court of justice that tried the king, 67 voted for his execution and 59 signed the death warrant, and these, with the officials and executioners, were the regicides. After the restoration of Charles II, Parliament ordered the arrest of the regicides. Some surrendered and others were caught, but a few escaped. Brought to trial, 29 of them were sentenced to death, but the sentence was only carried out



Reggio Emilia, Italy. Piazza Vittorio Emanuele, looking towards the Town Hall; on the left is the cathedral

in 10 cases, the others being imprisoned for life. Three others were afterwards caught and executed. Harrison and Peters were among those executed, and Edmund Ludlow was the last survivor.

Regillus. In ancient geography, a small lake in Latium, Italy. Situated E. of Rome, between Gabii and Labicum, it was famous



for the defeat of the Latins by the Romans, 496 B.C. The story of the fight is told in Macaulay's *Lays of Ancient Rome*.

Regiment (Lat. *regere*, to rule). Military term for a body of soldiers. In the British army the infantry

is grouped into regiments, most of which have a name and number. It consists of a number of battalions, each commanded by a lieutenant-colonel. The cavalry are also ranked in regiments, but these take the field as fighting units and are not divided into battalions. The artillery and engineers each form officially a single regiment. The word was first used in the 16th century, when each unit raised was called a regiment, e.g. Cromwell's regiment of horse. With the

foundation of a regular army came the practice of numbering the regiments, the numbers thus showing their seniority.

In foreign armies the constitution of the regiment varies. In the German and other European armies it is a fighting unit consisting of three battalions. See Army, British; Battalion, etc.

Regina. Capital of Saskatchewan, Canada. It is in the S. of the province, in the centre of the wheat-growing area, 360 m. from Winnipeg, and on the three transcontinental lines. Its chief buildings are the new home of the provincial legislature and the city hall. It is the residence of the lieutenant-governor, and was for a long time the headquarters of the Royal North-West (now Canadian) Mounted Police. Regina's industries are both distributing and manufacturing. For the former are grain elevators, warehouses, etc.; the latter include the making of agricultural implements, motorcars, bricks, and machinery, as well as tanning and milling. Before the foundation of the province Regina was the capital of the North-West Territories. Pop. 30,200.



Regina, Canada. Buildings of the Saskatchewan provincial legislature; top, left, the municipal offices

Regiomontanus (1436 - 76). German mathematician and astronomer. Born at Königsberg, in Franconia (hence his Latin name), June 6, 1436, his real name was Johannes Müller. Educated at Vienna, he became the pupil of Georg Purbach, and with him translated the works of Ptolemy, Apollonius, Archimedes, and Hero of Alexandria. In 1533 was published his *De Triangulis Omnimodis*, a treatise on plane and spherical trigonometry, and *Algorithmus Demonstratus*, 1534. Regiomontanus established an observatory at Nuremberg and compiled tables of eclipses and other astronomical data. His help was requisitioned by Pope Sixtus IV in connexion with the reform of the calendar, and he died in Rome, July 6, 1476. He wrote many works on astronomy and astrology.



Regiomontanus, German mathematician

Register (L. Lat. *registrum*, book of record; ultimately from *regerere*, to bring back). Written account or record; official list of particulars, and especially the list of persons entitled to vote at parliamentary and other elections.

Parish registers of births, marriages, and deaths were ordered to be kept by the incumbent of every parish in England and Wales by Thomas Cromwell, Henry VIII's minister, in 1538. Before this time a certain amount of information with regard to well-known personages had been recorded in the monasteries, and some of these sporadic records still exist. But the new order proved unpopular, and in many cases the registers were kept in so slovenly a fashion that in 1597 Elizabeth ordered copies to be sent to the bishop of the diocese. More stringent regulations for the accurate compiling of the registers, and for their safe keeping, were enacted by law in 1812, and in 1837 came official registration by a government department.

Nevertheless, despite defects and other hindrances to research, parish registers have proved of much value to students as affording contemporary evidence of the exact dates of births and deaths, and also as throwing by way of additional notes interesting sidelights upon social life and other matters which some old-time parsons thought well to set down in their dry-as-dust, passionless records of the passing generations of

men. Many parish registers have been published for general information by the Harleian, Parish Registers, and other societies. (See *Mortality*; consult also *The Parish Registers of England*, J. C. Cox. 1910.)

Wills were registered at Doctors' Commons, Knight-riding Street, London, E.C., until 1874, when they were removed to Somerset House.

British shipping was first registered in 1660 under the Navigation Act. The regulations were amended by legislation in the reigns of George III and William IV. The controlling Act is now the Merchant Shipping Act, 1894, which provides for the registration of every British ship, except those of 15 tons or under, plying on the rivers or coasts of the U.K., and certain vessels of 30 tons or under engaged in fishing or trading in and about the Gulf of St. Lawrence. (See *Lloyd's Register*.)

The term register is also employed for the sliding or adjustable plate for regulating the draught in a fire-grate; in printing, for the exact correspondence of the letter-press on both sides of a page; of the different colours in colour-printing. See *National Register*.

Register. (1) Division of the human voice, arising from the nature of the vocal cords, and evincing a difference of tone-quality. As it is obvious that the tension of the cords cannot be carried beyond a certain point, the upward range is continued by means of a change of mechanism. Different teachers have different names for these registers, the most common being chest, head, and falsetto. These terms accurately describe the respective aspects of the vocal cords in the successive registers, viz., lower and upper thick, lower and upper thin, and small. The aim of the teacher is to blend the registers so that the transition from one to another is effected without that abrupt change of quality, known as a break. (2) Synonym for organ stops. Registration means the indication of stops which the composer desires to be used. See *Voice*.

Registrar or **REGISTRARY.** One who keeps a register or record. In Great Britain a registrar was formerly called a register. In England there are registrars for the supreme courts and county courts, district registrars in large towns, registrars for companies, building and friendly societies, etc. A marriage certificate may be issued by a registrar. See *Friendly Societies*.

Registrar-General. Official who superintends the registration of births, marriages, and deaths in England and Wales. His head-

quarters are at Somerset House, London. The first registrar-general was appointed in 1836, and in 1874 he took over the compilation of vital statistics. To assist him there are registrars all over the country, who furnish particulars about their respective districts. By summarising these the registrar-general is able to issue quarterly returns of births, marriages, and deaths, and a yearly blue-book.

There is a registrar-general for Scotland, his offices being at the Register House, Edinburgh, and one for Ireland at Charlemont House, Dublin. The registrars-general and their departments are responsible for taking the national census. Quite distinct from these officials is the registrar-general of shipping and seamen, whose offices are on Tower Hill, London, E. He keeps the general register of births and deaths on board British ships. See *Birth Rate*; *Death Rate*.

Registration. Act or fact of registering. The word is used in several connexions. In Scots law it means the transcribing of documents in a public register, in order that an exact copy may be preserved for use in the event of the destruction of the original.

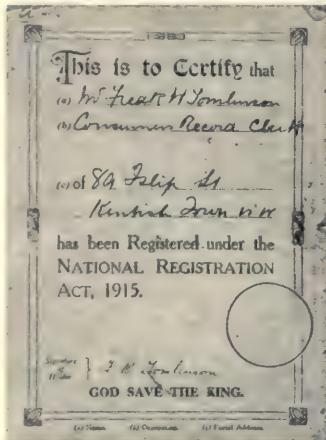
The registration of births, marriages, and deaths was made compulsory in England and Wales in 1836, and came into force in 1837. Before this time the only official source of information on this subject was the parish register (*q.v.*). By the Births and Deaths Registration Act, 1836, district registrars have to send copies of registers of births, marriages, and deaths to superintendent registrars, by whom they are forwarded to the registrar-general. Subsequent legislation put the onus of registering births on parents and others, and of registering deaths on relatives and others within certain limits of time after the event. As regards births the seven years' limit is now revoked. Marriages are recorded by the officiating clergyman, or, in certain cases, the registrar at the time of the ceremony. The registration of elections is a necessary preliminary to the exercise of the franchise.

REGISTRATION OF TITLE. All deeds of title relating to land in Middlesex and Yorkshire have to be registered—those of Middlesex in the Land Registry, London; and those of Yorkshire in the Yorkshire Registry. The object is to facilitate inquiries into the title to land, so that intending purchasers and mortgagees may be less easily defrauded. Bills of sale must be registered in the supreme court. See *Copyright*; *Land*.

Registration. Method of protecting money and other property from loss. Thus letters containing money orders and the like can be registered at any post office for a small fee, and luggage can be registered with railway companies. In both cases the carrying authorities then assume responsibility for loss up to a certain amount.

Registration. Term employed in artillery for the shoot to ascertain or check the gun error of the day. After calculations have been made to discover how the force and direction of wind, effect of atmospheric conditions, wear of bore, and quality of propellant, will affect the shooting of each gun in a battery, these corrections are applied, and the gun is laid on a target of which the exact range is known. The shoot is carefully observed, and the difference between the theoretical error of the day and the observed result of the shoot is recorded in the battery and applied to every subsequent shoot until the next registration. Guns should be registered before important shoots; it is, moreover, important to destroy, or, as was sometimes done in the Great War, remove the registration points of the enemy artillery. See Artillery; Ballistics.

Registration Card. Identification card issued in Great Britain under the National Registration



Registration Card. Reduced facsimile of identification card issued during the Great War

Act, 1915, to all males and females between the ages of 15 and 65. They gave the full name, occupation, and group number, postal address, and signature of the holder, as well as the stamp of the local authority which issued them. They were in most cases carried on the person for production, if necessary, to the police or other authority. See National Register.

Regium Donum (Lat., royal gift). Name given to the endowment granted to the Presbyterian and other dissenting Churches in Ireland by William III in return for their support against James II. Originally £1,200 a year, it was increased to £2,000 on the accession of George I, while in 1863 the grant amounted to nearly £40,000. As a consequence of the disestablishment of the Irish Church it was abolished in 1871, compensation being given.

Regnard, JEAN FRANÇOIS (1656-1709). French dramatist. Born in Paris, Feb. 7, 1656, he led an adventurous life until 1683, when he settled down to play-writing. He was the most brilliant of the followers of Molière, but his comedies, e.g. *Le Joueur*, *Le*



Jean Regnard, French dramatist

Légataire Universel, though witty in dialogue and clever in characterization, are wanting in that master's depth and moral earnestness. He died Sept. 4, 1709.

Regnault, ALEXANDRE GEORGES HENRI (1843-71). French painter. Born in Paris, Oct. 30, 1843, he studied under Lamothe and Cabanel, and won the Prix de Rome in 1866. He illustrated Wey's *Journey to Rome* and painted the fine portrait of General Prim, now in the Luxembourg. He was killed in action outside Paris, Jan. 19, 1871.



A. G. H. Regnault, French painter

Regnault, HENRI VICTOR (1810-78). French physicist. Born at Aix-la-Chapelle, July 21, 1810, he studied chemistry under Liebig, and in 1840 was appointed professor of chemistry at the École Polytechnique, Paris, becoming professor of physics at the Collège de France, 1841, chief engineer of mines, 1847, and director of the Sèvres porcelain factory, 1854. He died Jan. 19, 1878.

Regnault made a lasting reputation for his measurements of many physical constants, particularly those concerned with specific heat. He showed that the specific heat of an alloy can be obtained from those of its constituent parts, and that the specific heat of compounds bears a relation to the specific heats of the elements composing them. The famous physicist also

carried out a series of experiments on the densities, pressures, and volumes of gases which had an important effect on the kinetic theory of gases, and did valuable work in chemistry by his researches on the haloid and other derivatives of unsaturated hydrocarbons.

Régnier, HENRI FRANÇOIS JOSEPH DE (b. 1864). French poet and novelist. He was born at Hon-



Henri de Régnier, French poet

flour, Calvados, Dec. 28, 1864, and educated in Paris. A disciple of Mallarmé and Verlaine, he came to occupy a leading position among those so-called Symbolists. His many volumes of poetry included *Épisodes*, 1888; *Poèmes Anciens et Romanesques*, in which old-time stories were rendered with new symbolic significance, 1890; *Tel Qu'on Songe*, 1892; *Aréthuse*, 1895; *Les Médailles d'Argile*, 1900; and *La Cité des Eaux*, 1903. Among his works in prose fiction are *Le Trèfle Noir*, 1895; *La Canne de Jaspe*, 1897; *Les Vacances d'un Jeune Homme Sage*, 1903; *Le Passé Vivant*, 1905; and *La Peur de l'Amour*, 1906.

Régnier, MATHURIN (1573-1613). French satirist. Born at Chartres, Dec. 21, 1573, he was a poet of real genius, who showed his independence by ridiculing the all-powerful Malherbe. He wrote some charming *poésies diverses*; but his fame rests upon his 16 satires, the first masterpieces of their kind in French literature. He died, after a dissipated life, at Rouen, Oct. 22, 1613. See *Life*, J. Vianey, 1896.



Mathurin Régnier, French satirist

Regnitz. River of Bavaria. Its two headstreams unite near Fürth, and the river flows N. past Erlangen and Forchheim, and joins the Main near Bamberg. It is 125 m. long, and its chief tributaries are the Aisch, Grundlach, Aurach, and Zenn. It is navigable throughout its lower course.

Regrating (old Fr. *regrater*, to huckster). Formerly an offence against public trade. It is described in a statute of Edward VI as buying of corn or other dead victual in any market and selling it again in the same market or within 4 m. of the same place, and

was prohibited as tending to enhance the price of the provisions, since every successive seller must make a profit. With regrating, forestalling (*q.v.*) and engrossing (*q.v.*) were also forbidden. The offences were misdemeanours punishable by fine and imprisonment, and formerly also by the pillory (*q.v.*). The early statutes directed against them were repealed under George III. See *Profiteering*.

Regular (*Lat. regula, rule*). Word used in two main senses. Among the clergy a regular is a member of a monastic order, the opposite being the secular clergy who are not monastic. A regular soldier is one who joins the army for a long period and gives his whole time to it. Irregulars, on the other hand, join for a period of special need. See *Army, British*; *Monasticism*; *Secular*.

Regulator. Engineering term with various meanings. (1) A device for controlling the quantity of fluid passing through an opening. (2) A kind of valve, with shaft and lever or hand-wheel, by means of which an engine-driver regulates the quantity of steam passing from the boiler to the cylinders. The

at a high pressure may be delivered at a constant lower pressure, *e.g.* so that gas received at from 1 to 300 lb. per sq. in. may be delivered at $\frac{1}{2}$ oz. per sq. in.

Fig. 1 shows a locomotive steam supply regulator. A is a gridiron valve, B the regulating lever worked by the driver, C, steam inlet from boiler, and D, steam outlet to engine cylinder. Fig. 2 shows an automatic pressure regulator for steam, air, or gas. A is the high pressure inlet, B the low pressure outlet, D is a flexible diaphragm, E a spring which determines pressure at the outlet. When the pressure exceeds the limit, D is forced upwards and closes the valve G.

Regulus. First star in the constellation of the Lion or Alpha Leonis. In ancient Persia it was the chief of the four royal stars. It is a bright star of about the first magnitude, and has a very small parallax, making its actual brightness, according to Sir Robert Ball, equal to that of 1,000 of our suns. It has a double satellite of the eighth magnitude.

Regulus. In metallurgy, a term applied to metals not in a state of purity, especially those obtained from the oxide or sulphide by fusing with reducing agents. The word means "little king," and was first used to describe impure gold. It is now often applied to antimony. A violet-coloured alloy of antimony and copper is known as *regulus of Venus*.

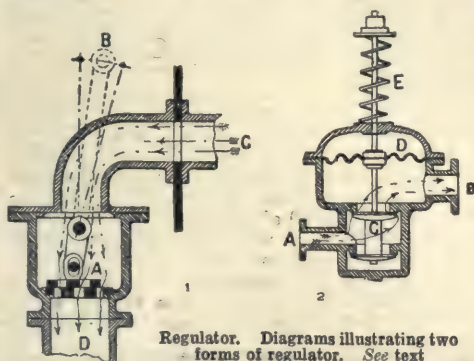
Regulus, MARCUS ATILIUS. Roman general. He became consul

for the second time in 256 B.C., and during his year of office, together with his colleague, defeated the Carthaginian fleet at Ecnomus. An expedition to Africa followed, in which Regulus defeated the Carthaginians and nearly reached the capital. But a Greek mercenary named Xanthippus, taking command of the Carthaginian forces, subjected the Romans to a crushing defeat, Regulus himself being taken prisoner. According to the story, Regulus

Carthaginians in 250 B.C., along with an embassy, to Rome, under parole to return if the peace which the Carthaginians desired was not arranged. So far from recommending the Romans to conclude peace, or even an exchange of prisoners, in order that his own liberty might be restored, Regulus advised them against either policy, returned to Carthage, and was brutally put to death. This story was probably invented to cover up the treatment of Carthaginian prisoners by the Romans.

Rehan, ADA (1860-1916). American actress. Born in Limerick, April 22, 1860, she spent her childhood in the U.S.A., making her first stage appearance at Newark, New Jersey, in 1874. She first played in New York in 1875, and showed her versatility as a comedy actress in over 200 parts in Augustin Daly's company, 1879-99. Her fame rested chiefly on her Shakespearean renderings, notably her *Rosalind*, *Portia*, *Cordelia*, *Desdemona*, and *Mistress Ford*. She appeared first in London in 1884, returning in 1886, 1888, 1890, and 1893-95. Retiring in 1906, she died Jan. 6, 1916.

Rehearsal (*Fr. re, again; herser, to harrow*). Word applied, from its etymological significance of going over the same ground again, to the repetition of specific words, as when the catechist asks the candidate for confirmation to rehearse the articles of his belief, and in a secondary sense to a detailed relation of events. Specifically the term is given to the preliminary practice of a musical or dramatic composition before its public performance. A full rehearsal is one at which the composition is performed in its entirety, with all the actors, musicians, and stage assistants present; a dress rehearsal, one at which the performers wear the costumes designed for the play; and a public rehearsal one to which the public are admitted. Villiers, duke of Buckingham, named one of his comedies *The Rehearsal*. See *Stage*.



Regulator. Diagrams illustrating two forms of regulator. See text

handle is mounted in the driver's cab, and is secured to a shaft passing into the boiler. At the front end the shaft is secured to a grid or perforated plate, which slides across a corresponding fixed grid or perforated plate at the entrance to the steam pipe. By rotating the handle or wheel the shaft rotates and brings the holes in the two grids opposite each other, thereby allowing steam from the boiler to enter the pipe and fill the cylinders. In some cases a balanced valve of mushroom type is substituted for the grid type. (3) A device for controlling the output of an electric generator on a railway car and maintaining constant voltage in the lamp circuit.

An automatic gas regulator is one which may be set so that gas



The actress as Rosalind



M. Atilius Regulus, Roman general
From a bust

According to the story, Regulus was sent by the

Rehoboam. Jewish king. Son and successor of Solomon, his treatment of the tribes led to a revolt of all except Judah and Benjamin, and a division of the kingdom. He was author of the phrase, "My father chastised you with whips, but I will chastise you with scorpions." During his reign Judah was conquered by Shishak, founder of the XXIInd Egyptian dynasty (1 Kings 12 and 14; 2 Chron. 12).

Rehoboth. Town and dist. of the S.W. Africa Protectorate. The town is 60 m. due S. from Windhoek, at the head of the Great Fish River Valley. The dist. has a coloured pop. of 9,300, about 4,000 of whom belong to the Bastards, a tribe of mixed descent who remained loyal to the Germans during the Herero rebellion. In 1918 they petitioned to be taken under the protection of Great Britain.

Reich. German word meaning empire, derived from one meaning rule. Although the emperor disappeared in 1918, the word was retained in Germany, which, in spite of having been made a republic, was still known as Deutsches Reich. See Germany.

Reichenbach. Town of Saxony. A rly. junction, it is 56 m. S. of Leipzig in the district known as the Vogtland. A centre for the manufacture of textile goods, machinery is also made. It is an old town, and was at one time a mining centre. Pop. 30,000.

Reichenbach. Town of Silesia, Germany. It stands on the Peile, 30 m. S.W. of Breslau. It has some textile industries, and manufactures beer and machinery. It is an agricultural centre. Here a congress was held in 1790 at which Great Britain and other powers guaranteed the integrity of Turkey, then threatened by Russia, and here in June, 1813, Great Britain, Austria, and other powers agreed to continue the war against France. A battle was fought here during the Seven Years' War, Aug. 16. 1762, Frederick defeating the Austrians. Pop. 16,400.

Reichenberg OR LIBEREC. TOWN of Czecho-Slovakia, in Bohemia. It is on the Neisse, 52 m. N.E. of Prague. The Rathaus, built by Neumann in 1888-93, is a fine example of the German Renaissance style, and the church of the Holy Rood dates from 1696. First known in 1348, the town is an important industrial centre. Pop. 36,000.

Reichenhall. Town and health resort of Bavaria, Germany. It is picturesquely situated amid lofty hills, on the Saalach, 10 m. S.W. of Salzburg. The convent of S.

Zeno, formerly an Augustinian monastery, was converted into the convent school of the order of Englische Fräulein (English girls). The Romanesque church, dating from the 12th century, contains a relief of Barbarossa. The saline springs are useful in cases of rheumatism and pulmonary affections.

They are the source of supply of Bavarian salt. An ingenious system of hydraulic machinery raises the brine over the mts., some of which are nearly 2,000 ft. high. It is then conducted by an aqueduct from Berchtesgaden through Reichenhall to Traunstein, a distance of about 60 m. Pop. 6,000.

Reichsbank. National bank of Germany, the equivalent of the Bank of England. It was founded in 1876 to serve as a bank for the new empire, being based on the existing Prussian state bank. It has the power to issue notes and serves the government as banker in various ways. The capital is owned by shareholders, but the state shares in the profits. The head office is in Berlin, and there are branches throughout Germany. The bank retained its privileges unchanged after the overthrow of the monarchy in 1918. Its original charter expired in 1920, but was then renewed.

Reichsland. German word meaning land of the empire. It was applied specially to Alsace-Lorraine during the period (1871-1918) when it was part of the German empire. The reason was that it was directly under the imperial government at Berlin.

Reichsrath. German for imperial council, the name given until 1918 to the parliament of Austria. It consisted of the Herrenhaus, or house of nobles, and the Abge-

ordnetenhaus, or house of representatives. The members of the former were the adult princes of the Hapsburg family, a number of nobles nominated by the emperor, ten archbishops and seven bishops, and certain men of repute as scholars, scientists, and the like. Members of the lower house were elected by all male Austrians over 24 years old, single-member constituencies being the rule. In Galicia, however, each district returned two members, and the system allowed for the representation of minorities. The house had 516 members, who were elected for six years and were paid. They elected their own president. Meetings of the lower house were temporarily suspended in March, 1914, and the names and constitutions of the houses were altered after 1918. It met in Vienna. See Austria.

Reichstadt, NAPOLEON FRANCIS JOSEPH CHARLES, DUKE OF (1811-32). Son of Napoleon I by the emperor's second marriage, he was born in Paris, March 20, 1811, and, amid the rejoicings at the birth of an heir to the empire, was



Francis Joseph Charles, Duke of Reichstadt

created king of Rome. On the fall of the empire, which occurred in 1814, Napoleon abdicated in his favour, but the empress Marie Louise hastened with her child to Vienna, and no effort was made to establish his



Reichsrath, Vienna. A session of the Austrian house of representatives in 1917. The president, Dr. Gross, is addressing the house from the tribune

right. Upon his mother becoming grand duchess of Parma, 1815, the lad remained in Austria, being expressly debarred from the succession to the duchy. In 1818 the emperor of Austria made him duke of Reichstadt. He died July 22, 1832. Rostand's play *L'Aiglon* (the young eagle), 1900, is written round the thwarted hopes and ambitions which embittered his life and hastened his death. As *L'Aiglon*, Sarah Bernhardt achieved one of her greatest successes. See *The Duke of Reichstadt*, E. Wertheimer, Eng. trans. 1905; *Napoleon's Son*, C. Tschudi, Eng. trans. 1912.

Reichstag. Literally, the day or the empire, a word often translated into English as diet. The rulers of the mediæval empire, like other European sovereigns, were in the habit of summoning their vassals to consult with them, and so arose the phrase Reichstag for the day of such meeting. These meetings became the diets of German history, and gradually became more formal and elaborate. The Reichstag met whenever summoned by the emperor until 1663; until 1806 it met regularly at Ratisbon.

When in 1871 the German Empire was founded, the name was given to one of the two houses set up in Berlin. It was composed of 397 members elected by a popular franchise for five years. The name and constitution of the Reichstag were retained after the changes of 1918. Its membership, however, was raised to 466, and their period of office reduced to four years. All men and women were given the power to vote. See *Berlin*; *Diet*; *Empire*, *Holy Roman*; *Germany*.

Reichswehr (Ger., empire defence). Name given after the revolution of 1918 to the regular army maintained by the German government. The Reichswehr was organized, like the army before 1918, on a territorial basis. Under the peace treaty of 1919 its maximum was fixed at 100,000. See *Germany*; *History*.

Reid, Sir George (1841-1913). Scottish portrait painter. Born at Aberdeen, Oct. 31, 1841, and trained as a lithographer, he studied under Mollinger and Israels. He painted genre in the Dutch manner, and some straightforward landscapes, but is best known by



Sir George Reid,
Scottish painter
W. E. Gray



Reichstag, Berlin. The president addressing the German assembly at the momentous sitting of Aug. 4, 1914

his realistic portraiture. He was elected A.R.S.A., 1870, R.S.A. in 1878, and P.R.S.A. in 1891, when he was also knighted. He died Feb. 9, 1913.

Reid, Sir George (1845-1918). Australian statesman. A son of the manse, he was born in Renfrew-



Sir George Reid,
Australian statesman
Russell

shire, Scotland, Feb. 25, 1845. In 1852 his parents went to Australia and settled in Sydney. In 1864 he entered the civil service of New South Wales, becoming a barrister some years later. He was elected to the state legislature in 1880, became minister of public instruction in 1883, and, after three years as leader of the opposition, was premier, 1894-99. Reid was a staunch free trader, and on that account was not very enthusiastic over the formation of the Commonwealth in 1901. However, he entered the first Commonwealth parliament, and was leader of the opposition until he became premier in 1904. But his ministry did not last twelve months, and in 1908 he retired from Australian politics. In 1909 he was appointed high commissioner to Great Britain, and took up his residence in London. He filled that post for five years, and in 1916 entered Parliament as M.P. for St. George's, Hanover Square. He died Sept. 12, 1918, having been made G.C.B., 1916.

Reid, Sir Hugh Gilzean (1836-1911). British journalist. Born at Cruden, Aberdeenshire, Aug. 11, 1836, he was editor of newspapers in Peterhead and Edinburgh as a young man, and founded several journals in Yorkshire, including

The North Eastern Daily Gazette. First president of the Institute of Journalists, 1888-90, he was also first president of the World's Press Parliament, U.S.A., and sat as

Liberal member for Aston Manor, 1886. He took an active interest in the affairs of the Belgian Congo, was knighted in 1893, and received the Ordre de Léopold, 1897, and the Ordre de la Couronne, 1899. He published several miscellaneous volumes, and died Nov. 5, 1911.

Reid, Thomas (1710-96). Scottish philosopher. Born at Aberdeen, April 26, 1710, and educated there, he was appointed professor at Marischal College, Aberdeen, 1752-64, and subsequently at Glasgow. He was the originator of the so-called philosophy of "common sense," meaning thereby the beliefs which all rational beings have in common. He was opposed to Berkeley's idealism, according to which we do not really perceive any external things, but only ideas. The latter is bound to lead to scepticism and can be combated only by the common-sense conviction that nature affords us an immediate certainty of our own existence and of the existence of sensual external things. Common-sense embodies a number of irrefutable, fundamental truths, independent of experience. Reid died Oct. 7, 1796.



Thomas Reid,
Scottish philosopher



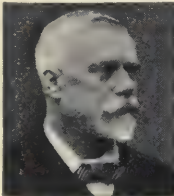
Sir Hugh Reid,
British journalist
Elliott & Fry

Reid, THOMAS MAYNE (1818-83). British novelist. Born at Ballyrone, co. Down, April 4, 1818, the son of a Presbyterian minister, he emigrated to America in 1839. He saw life in many phases and served in the U.S. army in the Mexican War of 1847. His experiences are embodied in a long series of stirring novels of adventure, among which the best known are *The Rifle Rangers*, 1850; *The Scalp Hunters*, 1851; *Afloat in the Forest*, 1865; and *The Headless Horseman*, 1866. Mayne Reid returned to Europe in 1849 and, except for a brief interval in America, lived in England until his death, Oct. 22, 1883.



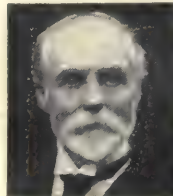
T. Mayne Reid,
British novelist

Reid, SIR THOMAS WEMYSS (1842-1905). British journalist and author. Born at Newcastle-upon-Tyne, and educated there, in 1870 he became editor of *The Leeds Mercury*, which he raised to a great position among provincial newspapers. He was appointed manager to Cassell & Co. in 1887, and edited *The Speaker*, 1890-99. He was knighted in 1894. Among his works are biographies of Charlotte Brontë, W. E. Forster, and Lord Houghton. He died Feb. 26, 1905.



Sir Wemyss Reid,
British journalist

Reid, WHITELAW (1837-1912). American journalist, author, and diplomat. Born at Xenia, Ohio, Oct. 27, 1837, during the Civil War he represented *The Cincinnati Gazette* as war correspondent. In 1869 he entered the office of *The New York Tribune*, of which he afterwards became editor and chief owner. Minister to France, 1889-92, in the latter year he was an unsuccessful Republican candidate for the vice-presidency. Twice special envoy to England, at the Diamond Jubilee of Queen Victoria, 1897, and the Coronation of Edward VII, 1902, he was appointed ambassador to Great

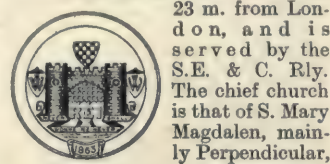


Whitelaw Reid,
American journalist
W. & D. Downey

Britain in 1905. He died in London, Dec. 15, 1912. He was the author of *After the War*, 1867; *Problems of Expansion*, 1900; *The Monroe Doctrine*, 1903; *American and English Studies*, 1914; and other works. See *Life*, R. Cortissoz, 1921.

Reigate. Mun. borough and market town of Surrey, England. It stands beneath the North Downs, 23 m. from London, and is served by the S.E. & C. Rly. The chief church is that of S. Mary Magdalen, mainly Perpendicular, but with fine transitional Norman arcades in the nave. Lord Howard of Effingham is buried here. Other buildings include the town hall, market house, and a grammar school dating from 1675. There are numerous caves beneath the town, which has an agricultural trade. An annual fair is held.

The town grew up around a castle built and held by the Warenne family, from whom it passed to the earls of Arundel. The castle was destroyed after the Civil War, and the grounds are now a public garden. There was also a priory here in the Middle Ages.



Reigate
borough seal

From 1295-1832 Reigate sent two members to Parliament, and from 1832-67 it sent one. It was only made a borough in 1863, although some of the rights are much older. In 1921 much property in the centre of the town was sold by H. Somers Somerset. He also sold his residence, Reigate Priory, and presented to the borough market and other rights. The borough includes the adjoining town of Redhill (*q.v.*). Pop. (1921) 28,915.

Reign of Terror. Term applied to the period in the French Revolution during which supreme power was in the hands of the Committee of Public Safety formed by the Jacobins, July, 1793. In addition to supporters of the old regime, hundreds of the revolutionaries themselves perished on the scaffold as a result of the general atmosphere of suspicious mistrust. See *French Revolution*; *Jacobins*; *Robespierre*.

Reims. Town of France, in the dept. of Marne. It lies on the right bank of the Vesle, 99½ m. by rly.

(via Soissons) E.N.E. of Paris. It is an important rly. centre, and is linked by canal with the Aisne and the Marne. E. of the town stretches part of the plain of Champagne; to the S.W. rises the vine-covered Montagne de Reims. The main activities are the champagne industry, of which it is the centre, and the manufacture of woollens, cashmeres, merinos, flannels, etc. It is the seat of an archbishop.

The cathedral was founded in 1211, but stands on the site of earlier churches, the last destroyed by fire in 1210. It is still one of the noblest Gothic buildings of France. The choir was completed, 1241, and the W. façade, with its three portals with over 500 statues, also in the 13th century. The whole was completed in 1428, but the spires were destroyed by fire in 1481. The rose window over the W. portals, the beautifully carved N. portal, and the twin W. towers, 267 ft., are among famous features of the exterior. The bombardments of 1914-18 severely damaged the cathedral. Although the main body of the building

stands, irreparable damage was done to the carvings, stained glass, and vaulting, though restoration is being carried out. The tapestries, paintings, plate, etc., were placed in safety, much glass was removed, and many carvings built over for protection.

The archiepiscopal palace (15th-17th century, with a 13th century chapel) was destroyed by fire, 1914; the fine 17th century town hall was gutted in 1917. The noble abbey church of S. Remi, 12th-15th century, and founded in the 6th century, was severely damaged, 1918. The Roman *Porte de Mars*, 4th century, still stands, but the *Hôtel Dieu* was destroyed, 1916, and the 13th century *Maison*

Reims arms



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Reigate, Surrey. Old Town Hall, in the High Street



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The west front of the cathedral, begun in 1241, is considered the most beautiful work of the Middle Ages. The deeply recessed portals are ornamented with Scriptural scenes, and contain over 500 figures, while the magnificent rose window is nearly 41 ft. in diameter. The spires of the towers were destroyed by fire in 1481

REIMS : WESTERN FAÇADE OF THE CATHEDRAL BEFORE THE GREAT WAR

des Musiciens demolished by shell-fire, though its famous statues were preserved.

Reims was an important Roman centre, known as Durocortorum, chief town of the Remi tribe. S. Remigius, bishop from 459-533, baptized the Frankish king Clovis here, 496. From 987 onwards Reims was the scene of the coronation of all the French kings save six, and the archbishops acquired great political importance. From 1420-29 it was held by the English, being recovered by Joan of Arc. It was captured by Marmont, 1814; and by the Prussians, 1870; and was in German occupation, Sept. 4-12, 1914. Reims was decorated with the cross of the legion of honour in 1919. Pop. (1914) 115,178. See Joan of Arc.

ATTACKS ON REIMS. The Germans in their advance into France entered Reims on Sept. 4, 1914, and sacked it a few days later. The allied victory on the Marne caused them to evacuate it, and the French entered it on Sept. 13. The latter, however, were not sufficiently strong to compel the enemy to retreat any considerable distance, and from Sept. 14, 1914, to Oct., 1918, the Germans bombarded the city continuously from the hills to the N. and E. Most of the inhabitants left, but about 17,000 remained, using the enormous wine-cellar as shelter.

The final German offensive of July 15, 1918, sometimes known as the battle of Reims, is described under the second battle of the Marne. Foch's counter-offensive of July 18 and the subsequent allied advance finally removed all menace to Reims. See Marne, Battles of the.

Rein (ultimately from Lat. *retinere*, to hold back). Controlling or guiding strap or cord attached to the bit of a ridden or driven horse. Either of the handles of a blacksmith's tongs is also called a rein. In the plural the word is used in such phrases as the reins of government, to express control. The reins (Lat. *reñes*) is also another word for the kidneys. In architecture, the reins of a vault are the parts between the crown and the spring or abutment. *Pron.* rain. See Driving.

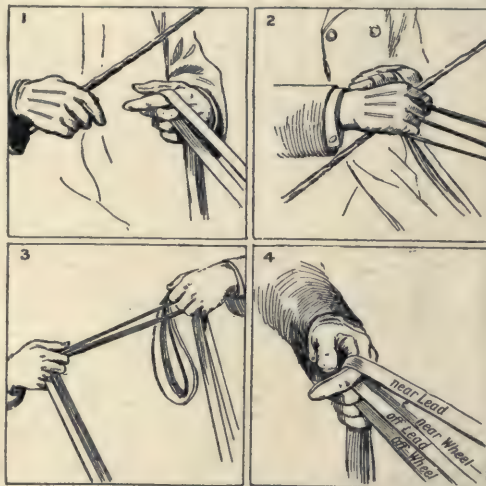
Reinach, JOSEPH (1856-1921). French politician and journalist. Born of a Jewish family in Paris, Sept. 30, 1856, he studied law, and attracted attention by his historical study, *La Serbie et le Monténégro*, 1876, and was prosecuted for a political pamphlet in 1877. He acted for a time as secretary to Gambetta, and sat as deputy for Digne, 1889-98. He was one of the strongest supporters of Dreyfus

(q.v.) in the demand for revision of the trial, and published a long detailed history of the affair, 1898-



Joseph Reinach,
French author

1905. He re-entered the chamber, 1906, and in the Great War served on the staff of Gallieni. His political articles under the pseudonym Polybe in *Le Figaro* were well known. He died April 18, 1921. His brother Salomon (b. 1858) was well known as an archaeologist.



Rein. Methods of holding driving reins. 1. Single harness. 2. Tandem. 3. Military hold for four horses. 4. Four in hand

1, 2, and 4, by courtesy of G. Bell & Sons

Reincarnation. Term meaning the assumption of human nature a second time or more than once. It is used to describe the process involved in the theory known as

metempsychosis or the transmigration of souls, which maintains that all personalities or types of being (including animals) enter into life upon the plane of earth, not once but many times, and assume different forms at every reappearance. According to one of the most ancient Buddhist books, a man, according to his deeds, may be reincarnated (a) among the evil spirits in hell, (b) as an animal,

(c) as a spectre or ghost, (d) as a man, (e) as an inhabitant of one of the seven realms of Heaven.

Plato, in the *Republic*, discusses in the form of an allegory the principle on which the condition of the reincarnate life is determined. Each soul draws its destiny by lot. If the lot determines that he shall be a king, for instance, the choice as to whether he shall be a good or bad king rests with himself. In the *Phaedrus*, however, he leaves less to chance. The soul which has seen most of truth comes to birth as a philosopher, that which has seen truth in the second degree as a righteous king, the next as a politician, the next as a gymnast or

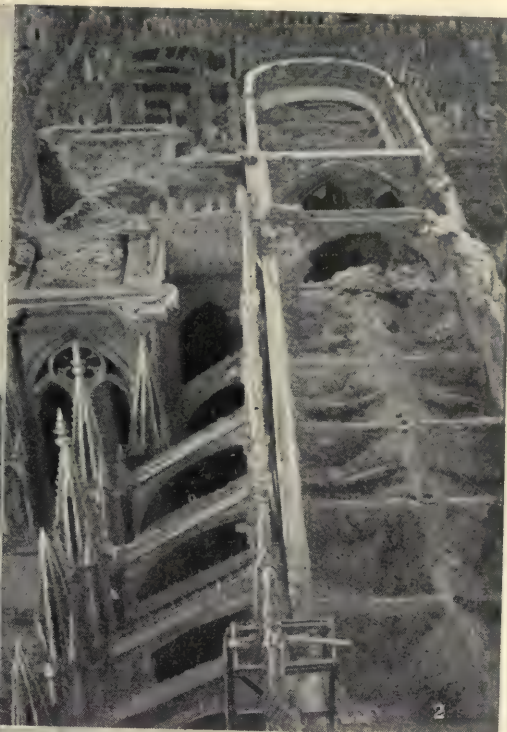
physician, the next as a prophet, the sixth as a poet, the seventh as an artisan, the lowest of all as a tyrant or demagogue. See *Psychical Research*; *Transmigration*.

Reindeer (*Cervus tarandus*). Species of deer. Found in N. Europe, Siberia, Newfoundland, Canada, and the United States, it is the only deer that has been successfully domesticated. In former times it had a considerably wider range, and its remains are not uncommon

in Great Britain and France. It is notable for the fact that both sexes bear antlers. Placed higher on the forehead than in other deer, they are very long and curved, and bend



Reindeer. Male of the N. European species of deer
W. S. Berridge, F.Z.S.



1. The cathedral, from the south-west. In the foreground are houses in the Rue de Chanzy, which, like the cathedral, suffered from the German guns. 2. Uncovered vaulting of the cathedral roof, broken in over the transept crossing.

3. Interior of the chancel looking towards the apse. 4. Fontaine Sube, almost untouched amid the ruins of the Place Drouet-d'Erlon. The figures upon it are symbolical of the industries and rivers of the neighbourhood

REIMS: RUINS OF THE CITY AFTER THE GERMAN BOMBARDMENT IN THE GREAT WAR

forward as they approach the tips. The extremity in some of the varieties is broadly palmated, and there is a conspicuous brow-tine, which is usually branched and sometimes palmated. This brow-tine is placed very low and often descends in front of the face. The feet are remarkable for their breadth and great spread, a special adaptation for travelling on snow in winter and boggy land in summer.

The reindeer is heavy in body and comparatively short in limb; the face is long and straight, the ears short and shaggy, and the hair of the pelt is somewhat long. In colour it is usually brown, with white on the neck, under side, and inner flanks; but the colour varies greatly in domesticated specimens, which are often grey or whitish. In height the reindeer ranges from 44 to 48 ins. at the shoulder in Europe, but has been known to attain 5 ft. in Canada.

The European reindeer occurs from Scandinavia to E. Siberia, but in many districts it is now very rare in the wild state. It has been domesticated from an early period, and it is the beast of burden in Lapland and in parts of Norway and Siberia. In the wild state it spends the summer in the grassy valleys, and moves in winter to the mountains, where it finds a scanty subsistence on lichens and moss. The American type of reindeer is commonly known as the caribou (*q.v.*). See Ice Age; Sledge.

Reindeer. Lake and river of Canada, mainly in Saskatchewan. The lake is in the N.E. of the prov., receives the Cochrane from the N., the Vermilion from the W., and is dotted with islands and islets. Its outflow is at the S. end by the Reindeer river, which flows almost due S. to join the Churchill.

Reindeer Moss (*Cladonia rangiferina*). Lichen or compound plant. It consists of an Ascomycetous fungus and an Algal in symbiotic association. It is found in abundance on heaths and hills, often in N. Europe covering vast tracts. It is a more or less erect, pale-grey plant, much branched, the ultimate divisions being pairs of short, drooping threads. It forms a valuable food for cattle and reindeer in Lapland and other northern countries. See Lichen.

Reinforced Concrete. Concrete reinforced by metal to take up the tensile stresses and strengthen resistance of material against other stresses. See Concrete.

Reinhardt, Max (b. 1873). Austrian theatrical producer. Born at Baden, near Vienna, Sept. 9, 1873, he worked in a bank, but made his first stage appearance in

Berlin, 1894, where he founded a cabaret theatre, the Schall und Rauch, and the Kleines Theater,



Max Reinhardt,
Theatrical producer

conceived productions of serious drama. In England he was best known as producer of the spectacle *Sumurun*, 1911, and of the large-scale spectacular piece, with music by Humperdinck, *The Miracle*, played at Olympia, London, 1911-12, and of *Oedipus Rex*, 1912. Theatrical art owes much to Reinhardt, who was himself influenced by the doctrines of Gordon Craig (*q.v.*). See *The Theatre of Reinhardt*, H. Carter, 1914.

Reinhold, Karl Leonhard (1758-1823). German philosopher. Born in Vienna, he settled in Germany, 1783, and died at Kiel, where he was professor of philosophy. His wife was the daughter of the poet Wieland. He did much to promote the study and understanding of Kant, but later adopted the ideas of Fichte.



Karl Reinhold,
German philosopher

Réjane, Gabrielle Charlotte (1857-1920). French actress. Born in Paris, June 6, 1857, her real name being Charlotte Réju, she made her début at the Odéon, 1875, and made a marked success at the Vaudeville in the same year. She was an actress of great versatility and disciplined technique, and made a memorable appearance as Catherine in *Madame Sans-Gêne* at the Gaiety Theatre, London, 1894, also in the same part, her most popular, in New York, 1895. The *Théâtre Réjane*, Paris, was opened in 1905, and in 1909 she toured S. America. She played at intervals in London between 1906-15, acted in cinematograph versions of her plays, and died on June 14, 1920.

Rejected Addresses. Series of English parodies. Published in 1812, it purported to be the compositions of the most popular poets of the day submitted for a prize offered on the occasion of the inauguration of the New Drury Lane Theatre. The authors were Horace

and James Smith (*q.v.*), the former's best efforts being the parodies of Byron and Scott, the latter's the parodies of Cobbett and Crabbe.

Relapsing Fever. Acute fever caused by infection by a spirochaete. Different forms of the parasite occur in Europe, America, Asia, and Africa, and cause differences in the symptoms. The European form prevails most in Russia, while epidemics of the disease have occurred in the past in the British Isles. The period of incubation, i.e. the interval between infection and the appearance of the symptoms, is believed to be about seven days.

The onset may be gradual or sudden, with severe headache, shivering fits, pains in the back and limbs, and rise of temperature. The liver and the spleen become enlarged. At the end of about a week the temperature suddenly falls, and the other symptoms disappear. In three or four days to a week, however, the symptoms recur, though the second attack may not be so severe as the first.

After recovery there may be a further relapse, and it is this characteristic which has given the disease its name. The great majority of cases recover, but in a small number complications, such as pneumonia, bronchitis, or haemorrhage, may arise and terminate fatally. The relapsing fevers of America occur in Panama in N. America, and in Colombia in S. America. In Asia, relapsing fever occurs in India and China. In Africa the disease is sometimes known as the African tic fever, and is found in Uganda, Congo Free State, East Africa, and the valley of the Zambezi. See Fever.



Gabrielle Charlotte Réjane in the character of *Madame Sans-Gêne*

RELATIVITY: TIME, SPACE, & MATTER

Professor H. Wildon Carr, D.Litt., Author
of *General Principles of Relativity*

*In connexion with this subject see the articles Energy; Gravitation;
Physics; also biographies of Einstein, Newton, and other scientists*

The principle of Relativity is a mathematical principle which claims to be more convenient in science, and to admit of much greater accuracy in measurements of physical phenomena, than the principle in use in classical mechanics. It is the principle that the velocity of light is constant for all observers, whatever the relative movements of the systems of reference (the earth, for example) to which they are attached, and that the movements of these systems are compensated for the observers by changes in what in mechanics are termed the space and time coordinates.

The principle we make use of every day in the course of our ordinary life is that distances and intervals are invariable, and unaffected by the particular objects or events which occupy them. To apply this principle we mark off a certain length in a rigid material, and it serves as an instrument for measuring the three dimensions of space; and we mark off the duration of the free swing of a pendulum, and register it by means of a chronometer, and it serves as an instrument for measuring time. From very ancient times this principle has seemed to mathematicians to suffer from a serious theoretical defect, viz. it is not a direct means of comparing distance with distance and interval with interval, and there is no way of knowing, with the certainty mathematics requires, that measuring rod and clock do not alter shape when they are moved.

Michelson-Morley Experiments

Until recent years this defect in the principle remained purely theoretical. Nothing had occurred in the observation of physical phenomena, and in the progress of physical science, to suggest any practical doubt concerning it. In the latter half of the nineteenth century, however, a series of remarkable experiments, culminating in the famous one known by the names of the experimenters, Michelson and Morley, completely changed the situation. It became necessary either to remodel the principle of invariant distances and intervals, or else to formulate a new principle. In 1905 Einstein formulated the new principle, now known as the principle of relativity.

In order to understand the nature and significance of the ex-

periments we must go back to the time of Newton and to the origin of what we now call the classical mechanics. In 1675, Roemer, a famous Danish astronomer, observed a phenomenon which could only be satisfactorily explained on the hypothesis that light signals do not arrive at the instant of emission, but occupy a definite interval of time proportional to their distance in space. What he discovered was that the moons of Jupiter required different periodic calculations for their eclipses according to the position of the planet in its orbit, and therefore of its distance from the earth. On the hypothesis that the phenomenon was due to the difference in the interval occupied by the light in reaching the observer, he calculated the velocity of light with an extraordinary accuracy, which later measurements with precise instruments have hardly modified. The effect of the discovery was far-reaching, and it led Newton to postulate absolute space and time.

Velocity of Light

With the rise of electro-magnetic science in the nineteenth century, the velocity of light became the factor of prime importance, for electro-magnetic phenomena are of the same nature as light. Experiments then began to be contrived with the object of measuring the effect on that velocity of movements of the system in which the light whose velocity was measured had its source. No one doubted that the movement of the source must produce an effect on the velocity of the propagation; the only difficulty seemed to be to discover the means of revealing it.

To the surprise of the experimenters, however, the results of all experiments proved to be uniformly negative, that is, the experiments did not fail, but they did not disclose the calculated effect, and at last the Michelson-Morley experiment, by the directness of its aim and the large scale of its apparatus, left no doubt that the effect which was being looked for did not exist at all. It was an experiment with a carefully contrived apparatus designed to show the movement of the earth in space, and its direction, by means of the change which the velocity of this movement ought to have produced in the velocity of the light projected from the instrument and reflected back to it

from a fixed mirror. The negative result of this experiment amounted to a new discovery.

The experiment was described in *The Philosophical Magazine* in 1886, and during the next twenty years mathematicians and physicists were engaged in attempts to explain the negative result. It was supposed at first that it must be attributed to some action of the ether on the masses of matter moving through it. Ether is the medium which was then generally admitted to be something which must fill space in order that the waves of light may be propagated. It was suggested by Fitzgerald, a professor of Trinity College, Dublin, that if the ether be all pervasive, and therefore not displaced when matter moves through it, then its effect on the moving matter may be to bring about a contraction of the matter in the direction of the movement, and this would account for the experiment being negative. About the same time and independently, Lorentz, professor at Leiden, suggested that this contraction effect might be a character of the electrons which constitute matter. If we suppose an electron at rest to be spherical, and to be automatically elongated when it moves, in the direction of its movement, the result would be a contraction proportionate to the velocity of the movement.

Einstein, however, took a different line. He ignored all theories and based his mathematics purely on the experiments. He accepted the results without explaining them or admitting that they needed explanation, and formulated the principle of relativity. It meant the rejection of the Newtonian principle that space and time are invariable, and the affirmation that velocity, that is, the ratio of space to time, is invariable. As all our observations of physical phenomena are dependent on light signals it must follow that the velocity of light is constant for all observers.

Results of the Theory

The new principle rapidly won adherents, but it was some years before it excited an interest outside the domain of pure mathematics. It was then seen that it involved very disconcerting consequences for some of the most fundamental ideas concerning the framework of the universe. The strangest result, perhaps, was that it showed the impossibility of assigning any absolute values to the time of an event or to the place of its occurrence, since these depended on its relations to other events, and these relations were different for all

observers attached to moving systems of reference, such as the earth.

In 1908, Minkowski, a Polish mathematician (who died in the same year at the age of 45), produced a mathematically beautiful construction of the universe conceived as a four-dimensional continuum, the fourth dimension being time. This universe (unlike Newton's conception of masses in space changing their relative positions in time) is constituted of events. An event is determined in relation to other events by four coordinates (length, breadth, depth, and time), and these vary for every observer according to the system of relative movement to which he refers it. If we imagine the track of an event in this universe we have what is called a "world-line." This universe is quite different from the common-sense conception of a world in space and time. For example, we believe that whatever happens at a particular moment is simultaneous with what is happening at every point throughout infinite space. But in the four-dimensional world there is no simultaneity at all. Any two events which for one observer occur at one instant may for every other observer be separated by an interval. Also there is no absolute place of anything. Any two events which for one observer happen in one place for all other observers may be in different places. Each observer will naturally take his "world-line" to be straight, and it will then be for him the criterion or standard, and all other "world-lines" will be curved.

Einstein's Calculations

Meanwhile, Einstein had become convinced that the principle of relativity must have a much wider application than that which restricted it to the special case of the velocity of light, and he turned his attention to the problem of gravitation. This was not a case where any results of direct experiment, positive or negative, had disappointed expectation. There was, however, one astronomical phenomenon which had obstinately defied all the attempts to interpret it conformably with Newton's law of gravitation. This phenomenon is known as the progression of the perihelion of Mercury. When the orbit of Mercury is calculated and allowance is made for all disturbing influences, there is a progression amounting to 40.2" in a century. In 1915 Einstein announced a new principle for the calculation of the phenomena of gravitation, and this was found to give (allowing for a practically negligible margin of error) the exact correction needed

to reconcile the discrepancy in Mercury's orbit.

The great glory of Newton had been the discovery of the law of gravitation, and it had ever since held its ground unchallenged. It was now found that if the new general principle of relativity were adopted, Newton's law would not undergo correction but have to be as entirely set aside and replaced as his absolute space and time had been by the special principle. Working out the gravitational field of the sun by the new principle, Einstein found that it showed that if the stars could be seen near the sun, i.e. in its gravitational field, they would be found to be displaced proportionately to their distance from the centre of the sun. The total eclipse of the sun on May 29, 1919, would therefore offer an opportunity of testing the matter. The interest this prediction awakened in scientific circles everywhere was intense. Two British expeditions were sent out, and the results obtained were announced to the scientific world at a meeting of the Royal Society in Nov., 1919. The predictions of Einstein were then declared to have been fulfilled.

The new principle rejects the notion of force and the idea of any action, direct or indirect, of one body on another. It declares inertia and gravitation to be one and the same phenomenon, either being the equivalent of the other, and it interprets the phenomena of gravitation, not by the properties of the masses, but by the geometrical structure of the space in which they are moving. This space in the neighbourhood of rotating masses of matter acquires the special geometrical character which constitutes a gravitational field.

Bibliography. General Principles of Relativity, H. W. Carr, 1920; The Theory of Relativity, W. H. Pickering, 1920; The Reign of Relativity, Lord Haldane, 1921; Relativity, The Special and General Theory, A. Einstein, 1921; Space, Time, Matter, H. Weyl, Eng. trans. H. L. Brose, 1921.

Relativity of Knowledge.

Theory, variously formulated, that knowledge is only relatively true. (1) Positive knowledge is impossible, owing to the ever-changing nature of the data of sense; we do not know things as they really are, but only as they appear to us. This is the doctrine of Protagoras: Man is the measure of all things; all knowledge is relative; each thing is for each man as it appears to him. (2) Our knowledge of particular things depends upon the relations in which they stand to other things. (3) In psychology, the view that sen-

sations only possess importance when related to other simultaneous or immediately previous sensations in the mind.

Relator. English law term. An action will lie at the suit of the attorney-general for a tort (generally a nuisance) of a public character, but the attorney-general proceeds not by writ but by information (*q.v.*); and he proceeds either of his own motion, or is set in motion by someone who really brings the action himself, but procures the attorney-general's consent to use his name. Such a person is called the relator.

Relay. Device used in electrical engineering to make a weak current close a path for a stronger current. It consists of a delicate electro-magnet which, when slightly energised, draws an armature against a stop and completes a local circuit of which the armature itself usually forms part. In telegraphy, relaying avoids the employment of strong line currents and thereby reduces insulation troubles.

The resistance of a conductor varies directly as its length; e.g. a telegraph wire 20 m. long has twice the resistance of one 10 m. long, the diameter being the same in both cases. To send a current of a certain strength through the first may require a pressure of, say, 20 volts. The same result will be obtained if the line be divided into two 10 m. sections, each provided with a battery giving 10 volts. The current passed through the first section operates a relay, which brings the battery of the second into action. In this way a signal can be, and frequently is, passed along through a large succession of circuits. See Circuit, Electric.

Relay Race. In athletics, a race in which several runners compete on either side, each covering a certain distance, his place being at once taken by a succeeding runner, until the tape is reached. The idea was possibly derived from the torch-race (*lampadēdromia*) of the Greeks, in one form of which the runners passed on a lighted torch to a waiting comrade. A similar procedure is sometimes adopted for cycling and other races.

Release. Term used in English law to describe the discharge of any right on any action. A release of a debt is an extinguishment of the debt, as distinguished from a receipt, which is merely *prima facie* evidence of payment. A release may be of a right of property; as where a partner, on retiring, releases all his rights in the partnership property to the remaining

partners; or where a lessor releases to the lessee the reversion expectant on the termination of the lease. *See* Receipt.

Relic (Lat. *reliquiae*, remains). In a religious sense, the body or part of a body of a saint or martyr, or some article, such as clothing, associated with a saint or martyr, preserved as an object of devotion or veneration. Generally, the word implies that which is left of an object after the loss or decay of its other parts, or a souvenir of one who is dead. Examples of religious relics are the remains of holy men preserved in churches or shrines; fragments supposed to have belonged to the true Cross (*q.v.*); and the Holy Coat of Treves (*q.v.*). Veneration of Christian relics began about the 4th century; it received marked impetus during the crusades; its persistence is exemplified by the search at Glastonbury for the Holy Grail (*q.v.*), or cup which held the wine blessed at the Last Supper; a strong reaction set in against it at the Reformation, and it is condemned by Article xxii of the English Prayer Book.

Burial places of martyrs were chosen by the early Christians for their meetings or services. Later, churches were built over the remains; and at one time consecration of a church was dependent upon the possession by that church of some holy relic. Gradually relics came to be associated with miracle working. Desire for the possession of them inspired the secret and fraudulent removal of remains from one church to another. In 1215 the fourth Lateran Council forbade relics to be sold or exposed outside of their cases or shrines, and prohibited veneration of relics until their authenticity had been decided by the pope. The custom, practically unknown among the Jews, is common to both Roman and Greek churches. *See* Altar; Miracle; Shrine; Worship of the Dead; consult also Decline and Fall of the Roman Empire, ch. 28, E. Gibbon, 1788; Rationalism in Europe, W. E. H. Lecky, new ed., 1910.

Relief (Lat. *relevare*, to raise up). Literally the removal of an evil. It is frequently used in connexion with distress arising from unemployment and the like. Relief works are works designed primarily to provide employment, and the word is used in connexion with the administration of the poor laws, as in the phrases outdoor and indoor relief. (*See* Poor Law). A relief map is one on which the form of the country is indicated by some conventional method such as the layer system. *See* Map.

Relief. In the feudal sense, a payment made by a tenant to his lord on taking possession of an estate held under him. Feuds, originally gratuitous, were also precarious, and held at the will of the lord, but as a more permanent degree of property was introduced, they began to be granted for the life of the feudatory, although they were not hereditary.

When feuds became hereditary, the relief was continued on the

To start men at work on jobs that have no immediate or permanent value, as has sometimes happened, is a foolish and short-sighted policy. But such work as road making, land reclamation, and re-forestation, if carefully controlled to prevent waste of public money, may do much to tide over an anxious and dangerous time. Relief works in the modern sense of the term date from later decades of the 19th century. In 1921, owing

to the prevalent unemployment, many relief works were started, as construction of arterial roads. *See* Unemployment.

Relievo. Italian term for the sculpture in relief used in the decoration with figure compositions of walls and other flat surfaces. The Greeks and Romans practised this kind of sculpture in its simpler forms. Some later Hellenistic work shows the introduction of pictorial or perspective relief, i.e. relief with differences in plane, and the commemorative columns erected in imperial Rome were a distinct effort after perspective effect.



Relievo in bronze. Door of the Baptistery, Florence, by L. Ghiberti, depicting scenes from the Old Testament

death of a tenant, although its original foundation had ceased. Being at first arbitrary and at the discretion of the lord, who by demanding an exorbitant payment could in effect disinherit the heir, reliefs were regarded as one of the great grievances of tenure. William the Conqueror therefore fixed the relief at a certain quantity of arms and habiliments of war, and, in the reign of Henry II, a composition of 100 shillings was universally accepted for every knight's fee, until relief was abolished with other feudal anachronisms. *See* Feudalism; Land.

Relief Works. Name given to works of a public character undertaken to provide a means of subsistence for the unemployed in times of distress. Action of this kind is admittedly no more than a palliative at best, and if taken unwisely may aggravate the disease.

This art, however, made little progress during the Middle Ages. Donatello's John Baptist on the font at Siena, completed in 1427, shows the treatment in a modified form; but Ghiberti's gates for the Baptistery at Florence are the first conspicuous instance of its employment. *See* Archaeology; Babylonia; Bambino; Bellerophon; Cleopatra; etc.

Religio Medici. Sir Thomas Browne's statement of his belief. It was written about 1635, and is quite short. It is divided into two parts, dealing with faith and charity. A devout member of the Church of England, Sir Thomas accepts the Christian belief in its entirety, finding in its mysteries and doctrinal difficulties only a further aid to faith. In this he represents his age, but the tolerant and large-hearted way in which he speaks of other creeds shows him far in advance of it. The work was very popular abroad, being translated into several foreign languages.

RELIGION AND ITS SYSTEMS

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This article concludes with a section on the extent to which the various religions prevail throughout the world, a subject illustrated by a colour map. See the articles on the great religions; Buddhism; Christianity; Confucianism; Mahomedanism; those on their various branches, e.g. Roman Catholic Church; and the Lives of their founders. See also the entries on religious terms, e.g. Priest, and on religious movements, e.g. Reformation

The probable origin of the word is the Latin *religare*, to bind, and the most general mark of religion is this obligation of the sacred. Religion has been defined as "that which deals with the relation of God and man." But a really comprehensive definition of the term is a matter of difficulty.

In the 18th century, when religion was regarded as chiefly supernatural information about the deity and miraculous interference in events, it was not impossible to define and easy to describe. Then the study of it was confined to the task of weighing by argument the evidence for past events, with the clear issue that, though all religions might be false, only one could be true. But, at the close of the century, the Romantic Movement, with its sense of variety in human nature and of action and progress in history, discovered in religion a fundamental element of mind which enters into every aspect of life, is a prime moving force in all history, and the truth of which can be measured only by the whole range of spiritual values. Large investigations then opened out in three distinct directions. The first is occupied with the actual forms and faiths in which religion has manifested itself, the second with its special place in the human mind, and the third with the nature of the external reality on which it depends. Thus we have the history, the psychology, and the metaphysic of religion.

Idea of the Sacred

But if we cannot begin with definition or achieve adequate description, we have the greater need of some distinctive mark to separate what belongs to the subject from what is only accidentally connected with it. A sufficient mark is the idea of the sacred. Yet this must not be conceived either too narrowly or too widely. Much has been truly and even effectively religious which stirs no feeling merely of awe in our minds, while magic, though regarded with awe, and many myths, were rather primitive science and primitive poetry than primitive religion.

When religion is thus conceived, the study of it is much more than the investigation of evidence for

the supernatural, and we can no longer make a clean cut between true and false religions. But this does not mean that the question of truth is set aside. The sacred is concerned with an absolute claim not to be reduced to the convenient or the prudent, but valid only if the values it affirms have objective reality, both as the true nature of man and the ultimate meaning of the world. That reality, therefore, alone can be the final interest in any part of the study; and an unbiased pursuit cannot mean, as is at times assumed, an absence of personal interest in the result, but should mean, as in other studies, that no interest we can have could be forwarded except by the truth.

Experience and Interpretation

If religion has to do with feelings, and trusts, and aspirations, and not merely with the rites and creeds which give them expression, it requires, more than most subjects, our own experience for its interpretation. Indifference to truth is not the necessary equipment for discussing religion without bias. We may not start with our own particular form of Christianity as the externally given perfect form of religion, and pick out what agrees with it and dismiss the rest. Yet it is only as we have a higher religious experience that we can hope to understand the lower.

The history of religion now covers an immense area of investigation. On the subject of primitive religion alone there is an extensive literature, and the sacred books and critical histories of any one great religion present a formidable amount of material.

Fuller investigation has made ever more doubtful the assertion that races are to be found wholly without religion. Without some sense of the sacred, making a higher demand than convenience, and giving a securer trust than the working of blind forces, man would scarce have arrived at the stage of being human. But, even if some tribe were discovered too low in the scale to be religious, it is certain that at a very early stage of culture religion appears as inevitably as curiosity about the world around or the attempt to organize society; and, if it thus manifests itself as soon as oppor-

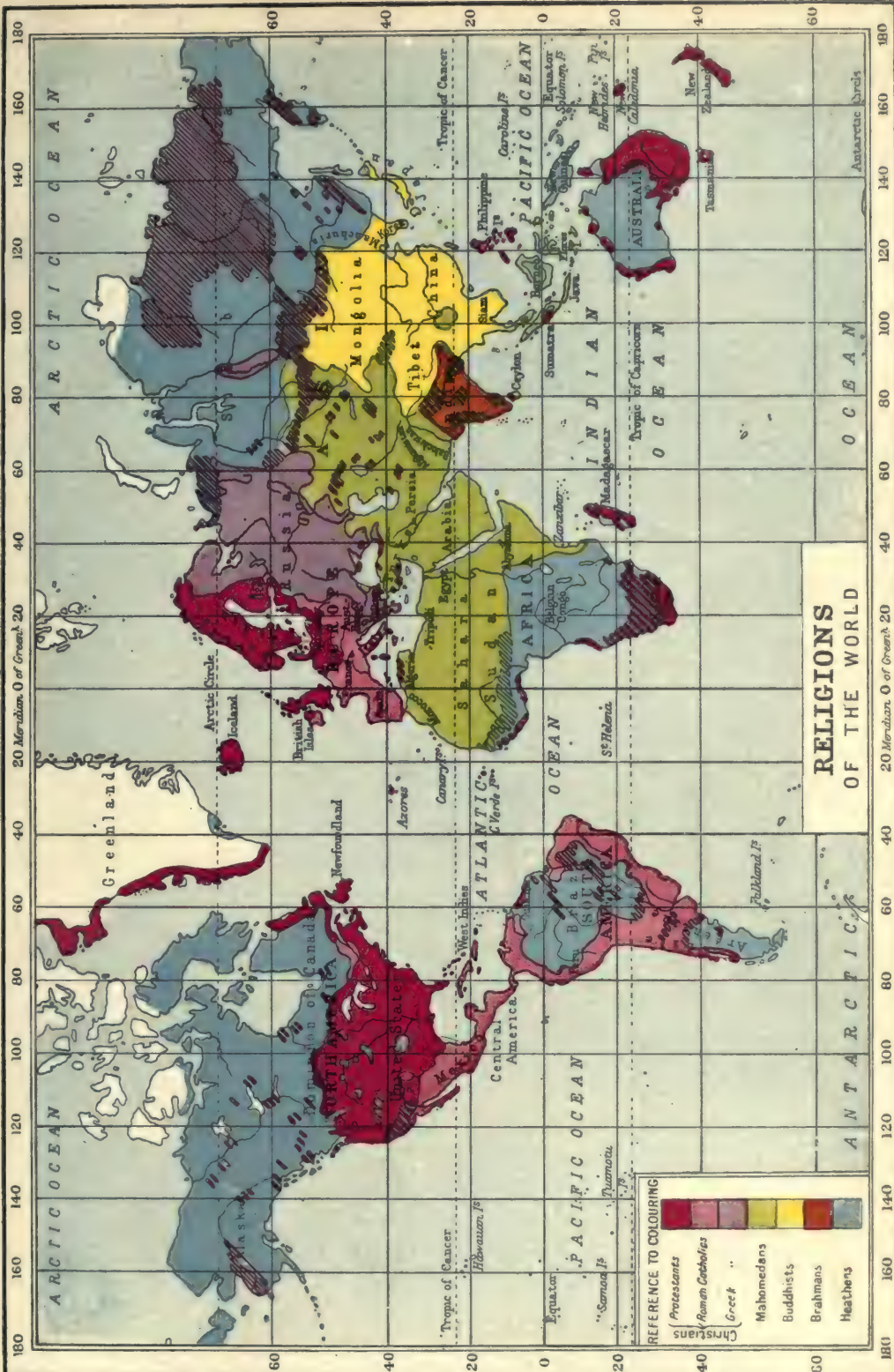
tunity offers, no more is necessary to prove that religion belongs to essential human nature.

The study of primitive religion seeks, as it were, to isolate the original germ. With regard to what can be achieved two mistaken ideas may be entertained. The first is that we may thus discover the origin of religion. Even the rites and ceremonies in which religion first expressed itself are beyond our knowing; and we have no means of discovering the thoughts and feelings they expressed, which are the real religion. But, even if we could, we still have not reached the origin of religion, which is, not how the idea of the sacred first came into use, but how it arose. That is a problem of mind, and not of history. The other is that the study may dispose of all religion as superstitions of the childhood of the race. If life's higher values were evolved out of it, we cannot dispose of even the lowest religion as superstition.

Evolution is not a device for getting higher values out of lower without anything being added, but at best some help towards showing how it was added, which still leaves what is added precisely the new, and, therefore, the inexplicable. Wherefore, religion, like all else that has entered into human life, must be estimated by what it is, and not by how it came to be. Even when the results offered are less ambitious, they must be received with caution. They are reached mainly through ancient writings, agricultural myths and customs, and the religion of savages. But a community which writes and tills the soil is not primitive, and the childishness of the savage is no sure guide for knowing the progressive childhood of the civilized. Yet, in spite of these difficulties, it now seems reasonably certain that the attitude towards the world which religion requires was first related to a sense of a power in things resembling man's own life; that the awe of the sacred world was early stirred by the great forces of nature; that religion was from the first social in its expression and the sanction of social bonds; and that it was the mother of arts, the instigator of inquiry, the spring of moral obligation, and possibly the source of reason itself.

Progress of Religion

The second branch of this historical study deals with the progress of religion. It may concern itself generally with a broad survey of the evolution of religious values, showing how the sense of the sacred detaches itself from the material things which first stirred



the sense of awe and is turned into reverence for truth and beauty and goodness, how redemption moves from deliverance from the physical ills which work bodily harm to victory over all the evil that is in the world by reconciliation to a purpose which is over them and beyond them, and how in that progress the spiritual faculties of the human race are liberated and exalted.

Methods of Classification

More recently the various religions have claimed attention, because all historical study of the subject confirms Schleiermacher's view that each religion is an organic whole, to be estimated not merely by weighing the proportion of its higher and lower elements. Yet, if we are to regard the religions as stages of progress, we must classify them, not merely geographically, but on a principle which will arrange them in some order of lower and higher.

The primary division put forward by Schleiermacher was between "religions without founders" and "religions with founders." This agreed with his view of religion as intuition of the universe, and of the religions as distinct intuitions; for a higher religion was impossible without some original religious genius to produce the intuition by which it was organized. This distinction between what we may call unprophetic and prophetic religions is of the utmost importance, as appears in the progress from the 8th to the 6th century B.C., due to such great prophetic persons as Zarathustra, the Hebrew prophets, Socrates, Buddha, Confucius, and Lao-tse. Nor may we ignore the influence of Moses on the national Hebrew religion; and there may be no religion which is not in some sense prophetic.

The division of religions into national and universal, or natural and ethical, are practically parallel, but national and universal elements are not always distinct; and, unless we restrict ethics to our own moral standards, there is no religion but is in some sense ethical. To the division into religions of nature and religions of redemption there is the objection that every religion is concerned with redemption, if only from the ills that threaten the bodily life. But that fact affords us the true principle of division, which is the kind of redemption each religion offers, to which must be related the values in man worthy of being redeemed, and the purpose above the world by which they are to be realized, and, therefore, the idea of God on which the purpose depends.

On this principle the following classification is suggested: (1) Religions of the natural life and of an animistic force, vaguely many and indefinitely one, whereby man seeks outward security through a power as personal as his own dim sense of his own personality in the communistic stage at which he lives permits. (2) Religions of anthropomorphism and external morality, whereby, having become an individual possessing property, man seeks to secure his state by beings like himself, who lay down external rules for what is yet mainly an outward life. (3) Religions of ecstasy and asceticism and acosmic morality, which either do not depend on gods, or whose gods are pantheistic and identified with the order of things, because, seeking to solve the problem of the world by escaping from it, they do not depend for help on any power that rules the world. Of this Buddhism is one type and Neo-platonism another. (4) Religions of monotheistic tendency and ethical dualism, which, having realized the organization of good and evil in the world, seek to secure a higher life by faith that the power of light must ultimately prevail over the powers of darkness. The typical example is Zoroastrianism, but the later Greek religion also belonged to it. (5) Religions of true monotheism and reconciliation, which secure the spiritual life by making it the one eternal purpose, and by faith in the one God who works through all things for it. To it belong especially prophetic Judaism and Christianity.

Psychology of Religion

The second study, the psychology of religion, deals with the origin and working of religion in the mind. From the time of the ancient Greeks, religion has been explained away as fear, or vanity, or the fashioning of the world according to our desires. Modern psychology has to acknowledge it an original and fundamental element of human nature, but many studies, especially from France and America, deal with matters like a pre-logical stage of mind, conversion, mysticism, social and mass religious ideas, still with the purpose of explaining religion on purely mental grounds without any external reality to which it corresponds.

Thus Durckheim ascribes to it all social progress and even the development of reason, but, though the sacred is thus eminently useful, it is apparently a mere social device without sanction from the nature of things; and Leuba regards it as an aspect of the will to live, encouraging us in our task of

managing the world by the imagination of beings like ourselves ruling behind its blind forces. Without the sense of sacred obligation above convenience, reason and social order and a victorious freedom in life could hardly have been achieved. But, if illusion works better than reality, we have not even a pragmatic basis for truth. A more serious psychology has sought to find the essence of religion in some aspect of mind—Kant in will, as the assurance of the moral order; Hegel in intellect, as popular philosophy; Schleiermacher in feeling, as artistic intuition of the whole in all things.

Later Interpretations

Kant is nearest the reality, but, as the values of religion also concern truth and beauty, later writers, like Dr. Inge, seek it in a harmony of all our powers. But no religious person is concerned to maintain this balance of self-culture. His interest in what is sacred is purely as he believes it to be concerned with an absolute and eternal worth in man, which corresponds with the ultimate meaning of the world. The psychology of religion is only an extension of the ordinary psychology of mind. It is an empirical science, dealing with observed facts of mind, without going on to speculate about the nature of reality. But it does not deal with mind as if mind were all.

The metaphysical of religion has to do with the higher world of spirit and our way of knowing it, being also simply an extension of the ordinary metaphysical of experience. This does not mean that all theology is philosophical abstraction, or that faith must be determined by philosophical demonstration, or that the spiritual values which have required great prophetic souls and the long process of history can be produced by philosophical argument from the individual mind. On the contrary, it is the business of this study to justify for religion its own way of knowing its realities. Especially it must show how the question of God means the reality of the absolute claim of all that is of final worth in man and all that he holds sacred in life. J. W. Oman

GREAT RELIGIONS OF THE WORLD. The word heathen, as used on the map, comprises those primitive peoples whose attitude to the supernatural may be comprehended under the general term magico-religious. It is to be preferred to animist because animism does not cover all forms of primitive belief. Some of them were pre-animistic, some tend to pass into

polydaemonism, if not into polytheism. All may be regarded as representing steps by which the religious idea advanced from the contemplation of nature to the recognition of the supreme power behind. They include such specialised aspects as the fetishism of W. Africa, the nature-worship of aboriginal America and Australia, and the shamanism of N. Asia. They possess two characteristics in common; they are non-ethical, and are not founded on a law or scripture.

Outside the pale of heathendom thus defined lie the world's great ethical religions. The oldest of them is Judaism, the national monotheism of the Jewish people, remarkable for the fact that, cradled in W. Asia, it is now disseminated by racial dispersion over almost the whole earth.

Side by side with this outcome of the Semitic spirit arose in a later age, out of the personalised polytheism of Vedic India, the great system of Brahmanism, which still penetrates the religious and social life of Hindustan. Nowadays this term, properly denoting the ancient Brahma-worship, offered through the priestly offices of the Brahman caste, loosely embraces also many later and diverse sects which are preferably classed as Hinduism. This comprises such developments as Saktism, Lingayatism, and Sikhism, as well as the widespread popular religions which, especially among the aboriginal villagers of S. India, are suffused with animistic practices and with survivals of primitive nature-worships.

In the 6th century B.C. arose the reform founded by Gautama Buddha. Dominant in India for many centuries, it has long been submerged in its homeland by modern Hinduism. The first great missionary faith, it prevails to-day in Ceylon, Burma, Siam, China, and Korea. In the form of Lamaism, which has absorbed both animist and Hindu elements, it is found in Tibet and Mongolia. In Japan it has profoundly affected Shintoism, itself originally a local development of animism.

While the Buddha was spreading his teaching in N. India, Confucius was preaching an ethical philosophy of an altruistic cast in China, and his contemporary Lao-tse was promulgating those views which were ultimately to develop into Taoism. China's state religion recognizes the supremacy of Confucius, but in the popular mind religion and its ritual of ancestor-worship have been much affected by the influence of Buddhism, while modern Taoism is a polytheism with much primitive anim-

ism. Christianity, the supreme faith of mankind, stands alone both in the ethical and in the spiritual sphere, in the number of its adherents, and in the universality of its appeal.

The latest of the great religions is Islam. Founded in the 7th century A.D. by Mahomet, it embodies Jewish and Christian elements, but from the outset manifested marked hostility to both. From its Arabian cradleland it spread over N. Africa in one direction, into Persia, India, and central Asia in another, besides following the path of Arab migration into Malaysia and modern negro Africa.

B. G. HARMER

The following table, giving approximately the numbers of adherents of the chief religions, is in general use:

Heathen	158,000,000
Jews	12,000,000
Brahmanists and Hindus	210,000,000
Confucianists and Taoists	301,000,000
Buddhists	138,000,000
Shintoists	25,000,000
	464,000,000
Christians :	
Roman Catholic	273,000,000
Greek Catholic	120,000,000
Protestant	172,000,000
	565,000,000
Mahomedans	222,000,000
Unclassified	15,000,000
	1,646,000,000

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Religious Tract Society. British society founded in 1799 and incorporated, 1899, for the publication of tracts and other evangelical literature. Its committee consists of an equal number of Churchmen and Nonconformists. During recent years the operations of the society have been widened to include the publication of popular scientific and educational works. During the Great War many million copies of books and magazines

were distributed gratuitously among soldiers and sailors and prisoners of war.

Remainder. Term used in English real property law. The law about remainders is very technical. When a particular estate of freehold is granted to a person, with remainder to another, it means that the latter is to take the property when the particular estate determines. An illustration will make this more clear. X is the owner of Blackacre. He grants or devises it to A for life (particular estate) with remainder to B in fee. B takes on A's death; and even if B dies before A, B's heirs take.

A contingent remainder is one limited to take effect on the happening of an event or the fulfilment of a condition which may or

may not happen until after the determination of the particular estate. As when X leaves his property to his widow for her life, and after her death to his son John if he shall then have attained (or on his attaining) 21 years of age in fee. There used to be a great deal of techni-

cality about contingent remainders; but these have mostly been cured by the Act 40 and 41 Victoria c. 33.

Remand (Lat. *remandare*, to order back). In law, the adjournment by a criminal court of the hearing of a charge against an accused person. The prisoner may be either retained in custody or admitted to bail. A remand in custody, if by verbal order, must not be for more than three days; if on a written warrant, it should not exceed eight clear days. Children under 16 are remanded, not to prison, but to remand homes specially provided. *See* Trial.

Remarque (Fr.). In etching, an early impression containing in the inscription space a small vignette representing some subject more or less appropriate to the print itself. Lettering in such a proof is usually curtailed or omitted altogether. *See* Etching.

Rembang. Residency and port of the Dutch E. Indies, in Java. The residency is along the N. coast; it contains a third of the teak forests of the island; petroleum and sugar-cane are obtained. Pop. 1,300,000. The port is open for trade; it is on the N. coast, 50 m. N.E. of Samarang, with which it has rly. connexion. Pop. 14,000.

Rembrandt (1606-69). Dutch painter, whose full name was Rembrandt Harmensz van Ryn. Son of a miller, Rembrandt was born at Leiden on July 15, 1606, and was apprenticed to a local painter named van Swanenborch. He also studied for a time at Amsterdam under Pieter Lastman, but his preference for independent observation and methods of work brought him back to Leiden in 1624. Several paintings and many etchings showed that he strengthened his command of drawing and the use of oils between that date and 1631, when, with a growing reputation, he settled in Amsterdam. His fame was firmly established by the Anatomy Lesson, now at The Hague, which he painted on commission in 1632. In 1634 he married Saskia van Vlyenborch (d. 1642), whom he portrayed in various paintings and drawings.

During the following years his commissions and pupils increased in numbers, and among the productions of these prosperous years were *The Bride of Tobias* (Hermitage, Petrograd), 1636; *The Angel leaving Tobias* (Louvre), 1637; *The Marriage of Samson* (Dresden), 1638; and the self-portrait now in the National Gallery, London, 1640. In 1640 came *The Canal*, first of Rembrandt's landscape etchings from nature, *The Windmill* etching following in 1641.

After the completion in 1642 of the great painting generally called *The Night Watch* (Amsterdam), a corporation painting for the Amsterdam Civic Guard, Rembrandt's fortunes seemed to be crossed. His expensive style of living and his natural generosity diminished his quickly made fortune, and rapidly mounting debts led to his being declared bankrupt in 1656, when his valuable private collection of works of art was sold up for the small sum of 5,000 florins. But his powers remained undiminished, and these last years of misfortune saw some of his finest works, among them *The Adoration of the Magi* (Buckingham Palace), 1657; a fine self-portrait (Munich), 1658; and the well-known *Syndics of the Guild of Drapers* (Amsterdam), 1661. In 1662 died Hendrikje Stoffels, his mistress faithful in misfortune, whom he probably married after 1656. The master himself died in poverty at Amsterdam, and was buried in the Westerkerk, Oct. 8, 1669.

Rembrandt's development as a painter shows three main periods. In his first manner, influenced by his masters, he is tentative, dwelling with care upon detail, but early showing individuality by his use

of a full light upon his centre of interest. The Philosopher, about 1630, in the National Gallery, London, shows well the qualities that were later to develop. After a few years in Amsterdam, his second period, about 1635-42, shows a freer expression of personality. Detail is abandoned for bold, solid strokes of the brush; conception and treat-



Rembrandt
Self-portrait

ment of subjects are broader; the characteristic tones of gold and brown are freely used; and great dramatic force is given by his contrasted effects of light and shadow.

In his third phase, 1642-69, we find Rembrandt making even fuller use of his discovery of the power of chiaroscuro, delighting in massive effects of dark shadow built up of rich sombre colours, and bringing into his schemes a peculiar deep glowing red. These qualities, "Rembrandtesque," as they came to be called, have profoundly influenced the character of painting since his time.

In the history of etching Rembrandt stands pre-eminent. Controversy has been keen as to the genuineness of all the plates ascribed to him, but he can safely be credited with about 290, and, like his paintings, these have had great artistic influence. Broadly his etching developed along lines parallel with his painting. After about 1640 he passed from detail to use of the dry-point to stress his light and shadow effects, well seen in *The Three Trees*, 1643, and after 1650 shows a wonderful mastery over the whole tone of his plates, memorable among which are *The Christ with the Sick* around Him (the "Hundred Guilders Print"); *Christ Appearing to the Disciples*,

1650; and *Christ between His Parents*, 1654. See *Abraham*; *Absalom*; *Dutch Art*; *Etching*; *Haman*; *Jesus Christ*; *Painting*; consult also Rembrandt, H. Knackfuss, Eng. trans. 1899; Rembrandt, H. Rea, 1903; *The Etchings of Rembrandt*, P. G. Hamerton, 1905.

Remembrance. J. E. Miles
In several senses cognate to its recognized meaning of recollection or bearing in mind.

The League of Remembrance, whose headquarters are at 1, Marlborough Gate, London, organizes a supply of medical and surgical requisites and clothing to naval, military, and civil hospitals and other institutions and organizations engaged in the promotion of health or social welfare, also maintaining an organization to be made available for mobilisation and expansion in cases of emergency. In its original form it was the War Hospital Supply Depot, 1914-19.

In 1920 the Roads of Remembrance Association was inaugurated. Its object is to promote the planting of memorial trees along suitable roads, at crossways, etc., to commemorate the sacrifices of the British in the Great War. Among new and existing roads which the association has beautified, or proposes to beautify, are those connecting Kew Bridge with the Bath Road, as a memorial to Middlesex men; the Croydon by-road, in Surrey, running from Thornton Heath to Purley; the adornment of the new border bridge over the Tweed; and the replacement of the wooden bridge by a stone bridge across the Ouse at Selby, Yorks.

Remembrancer. Title formerly held by certain clerks of the English exchequer. The king's remembrancer, with whose office that of lord treasurer's remembrancer was amalgamated in 1833, was an officer who "reminded" the judge and kept certain records. He is now head of a department of the central office of the supreme court. In London the city remembrancer is an officer who watches the legislative interests of the corporation.

Remington, PHIL (1816-89). American manufacturer and inventor. Born at Litchfield, New York, he became one of the controlling heads of his father's small-arms factory. He was the inventor of the breech-loading rifle which bears his name, and in 1873 was one of the first to construct a practical typewriter. The Remington rifle was adopted by several European governments, and supplied to the Federal government during the Civil War.

Remiremont. Town of France. It stands on the left bank of the Moselle in the dept. of Vosges, and its manufactures include cotton, hosiery, and boots and shoes. The chief building is the abbey church, mainly of the 14th century, although it has an older crypt. Of the other abbey buildings the palace of the abbess was made into the municipal headquarters, and was rebuilt on the original plan in the 19th century, but some of the houses of the canonesses remain.

The town was founded about 800, and about 1100 the nuns from an abbey, founded on a hill near by S. Romaric, removed here, and their house soon became wealthy and famous. The abbess, who was strong enough in the 16th century

bons, etc. The buildings include churches and technical schools. Remscheid was founded about 1100, and its industries established by Protestant refugees from France and Holland in the 17th century. Their great development, however, dates from the opening of the Westphalian coal-field in the 19th century. Pop. 72,000.

Remus. Twin brother of Romulus, the legendary founder of Rome. See Romulus.

Rémusat, CHARLES FRANÇOIS MARIE, COMTE DE (1797-1875). French philosopher and statesman. Born in Paris, March 14, 1797, the son of Auguste Laurent, comte de Rémusat (1762-1823), one of Napoleon's chamberlains, he studied law, and published various political and critical articles at an early age.

Influenced in youth by Guizot, he became a deputy, 1830, and was minister of the interior under Thiers, 1840. His works include *Essais de Philosophie*, 1842; *Sur la Philosophie Allemande*, 1845; *Abélard*, 1845; *S. Anselme*, 1852; and *L'Histoire de la Philosophie Anglaise depuis Bacon à Locke*, 1875. Admitted to the Académie Française, 1846, he was exiled by Napoleon III, 1851-59, held office again under Favre, 1871-73, and died in Paris, June 6, 1875. See Thiers, Guizot, Rémusat, J. F. Simon, 1885.



Remiremont, France. The Town Hall, formerly the palace of the abbesses

to carry on a war with the duke of Lorraine, was a princess of the empire, and the 50 canonesses were all of noble birth. The house was suppressed at the Revolution. The town is surrounded by hills, and is in the area which before 1919 was protected by the fortifications of the Moselle. Long part of Lorraine, it was joined to France in 1766. Pop. 10,500.

Remount Establishment. Department of the British war office concerned with the maintenance of the supply of horses for the army. It is controlled under the Q.M.G.'s department by the director of remounts. Mobilisation includes horses as well as men, and in addition to the large numbers automatically available from private ownership, purchases are made in all horse-breeding countries. In peace time the department provides a reserve of horses to supply wastage in the cavalry, artillery, and other branches.

Remscheid. City of Prussia, in the Rhine province. It is 49 m. from Cologne and 6 from Elberfeld, and is an important industrial centre, its works including rolling mills, machine shops, and factories for making iron and steel tools, rib-



Remscheid Prussia. Park and lake of Talsperre, in the vicinity of the town



Comte de Rémusat, French philosopher

THE RENAISSANCE

W. H. Hudson, M.A., Author of *The Story of the Renaissance* and Professor W. R. Inge

In connexion with this article, which contains a section on Renaissance Architecture, see the biographies of the scholars of the Renaissance, e.g. Colet; Dante; Erasmus; More; Petrarch; and those of the painters of the period. See also Humanism; the histories of the various countries, England; France; Italy; etc., and the article Reformation

The Renaissance (Fr. from *re*, again; *naître*, to be born) may broadly be defined, in Jebb's phrase, as "the whole process of transition in Europe from the medieval to the modern order." In a restricted sense the Renaissance means the revived study, in the new secular as contrasted with the old monkish spirit, of the literature of classical antiquity.

This revival of learning, as it is also called, was itself a chief agent in the emancipation of the mind of man from the trammels of effete dogmatism, and in the creation of a fresh intellectual atmosphere and of fresh ideals of life. It may be said to have begun in Italy with Petrarch and Boccaccio. But the real movement dates from the time when Manuel Chrysoloras of Con-

stantinople lectured on Greek at the university of Florence, 1396, and afterwards taught in other Italian cities. Henceforth classical studies were pursued by the new generation of humanists with growing enthusiasm, to which a further impetus was given when, on the capture of Constantinople by the Turks, 1453, many Greek scholars sought asylum in Italy.

Quest for the long-buried treasures of Greek and Latin literature now became a passion; monasteries were ransacked for manuscripts; and the recovered texts were collated and edited by eager scholars, and reproduced first by copyists and later by the printing-press, a great factor in the development of humanism. An important part was played by the famous

patrons of learning, ecclesiastical and lay—by popes like Nicholas V, secular rulers like Alfonso the Magnanimous of Naples, and wealthy merchant princes like Cosimo de' Medici (1389-1464) of Florence, and his grandson, Lorenzo the Magnificent (1448-92). Florence was long the centre of the new culture, but under Lorenzo's son, Pope Leo X, Rome became the intellectual capital of the world. During his pontificate (1513-21) learning and art flourished in marvellous luxuriance, but corruption and profligacy were now rife, and it was a luxuriance which suggested decay. His death marks the end of the Golden Age of the Italian Renaissance, the history of which closes with the sack of Rome, 1527, and the fall of Florence, 1530.

Influence in Germany

Meanwhile the movement thus initiated by Italy spread to other countries. Roelof Huysmann, better known by his Latin name Agricola, was the first to carry into Germany "out of Italy a breath of the higher culture," but his fame was soon overshadowed by that of Johann Reuchlin, Melancthon, and the wandering Dutch scholar Erasmus, who may be described as the great leader of the Renaissance north of the Alps. In Germany, however, the interests of humanism were quickly swamped by those of theology, and the progress of the revival of learning was definitely arrested when Luther plunged the country into the fierce struggle with Rome.

France on the contrary provided a favourable soil for the Italian seed. As early as 1458 Gregorio Tifernas, a pupil of Chrysoloras, had lectured on Greek at the University of Paris, and though little came of it at the time his teaching gave a first impulse to the Hellenist revival. Then came Charles VIII's invasion of Naples, 1495, which led to what Michelet called the French "discovery of Italy," and from the intellectual intercourse between the two countries thus opened up we may date the real French Renaissance which culminated under Francis I (1515-47). During the 16th century French scholars like Budé and the younger Scaliger were well to the fore among European humanists, while the poet Ronsard and his disciples of the Pléiade sought inspiration in the works of Greco-Latin antiquity, thus inaugurating the classic movement in French literature.

In England, too, the revival of learning was the product of Italian influence. From the middle of the

15th century English scholars began to cross the Alps to study in the great Italian universities, and what they learned at Padua, Bologna, and Florence they taught in turn at Oxford and Cambridge. The pioneers of English humanism were Thomas Linacre and William Grocyne, who numbered among their pupils at Oxford Sir Thomas More and his friend John Colet, the first important connecting link in England between the Renaissance and the Reformation. Henry VIII's favour helped the progress of the new learning among the aristocracy. At the same time in England, as in Italy, there was a great general educational revival, and many schools expressly devoted to such new learning were established throughout the country, which diffused classical scholarship in the rising generation and greatly contributed to that splendid outburst of literary activity which gave glory to the Elizabethan Age.

Effects of the Movement

In its larger aspects the revival of learning may be regarded from two points of view: as providing through the renewed study of the classics fresh models of literary art, and as bringing the mind of man into living touch with the mind of antiquity. On the one side it thus led to a re-birth of literature in all the great European nations; on the other, it broadened the intellectual horizon, and generated a liberal and progressive spirit.

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W. H. Hudson

RENAISSANCE ARCHITECTURE. Name given to the style of building practised in Italy and Western Europe during the age of the revival of classical learning. Sometimes the word is restricted to the earlier phases of the process. In modern England an alternative for the term Renaissance architecture was Italian style, but further study has brought a knowledge of French, German, Spanish, and other Renaissance styles. The English

Renaissance style now applies sometimes to the earlier works only; sometimes to the later and more scholarly ones as well. The phases are distinguished also by separate names, as Elizabethan, Jacobean, Stuart, Georgian, etc. As examples of the Italian Renaissance style in England, St. Paul's Cathedral and Somerset House may be mentioned as known to everyone.

The art of N. Italy up to the turning point towards the Renaissance had been Germanic, and its centres were at Milan and Como. We now name this art Lombardic; the old Italians themselves called it the work of the *Tedeschi* or Goths. During the 12th century a new school of architectural workers was formed in Rome; they worked in marble, and, refusing the barbaric elements of Lombardic art, studied the great buildings of antiquity and learnt mosaic working from the East. That this was a movement consciously entered on by a group or guild of artists in a national spirit in opposition to the intrusive *Tedeschi* is shown by the inscriptions on a series of monuments, on each of which the chief craftsman signed his name, adding the proud and significant words *Civis Romanus*, definitely recalling the ancient *Civis Romanus sum*. We have in Westminster Abbey several works of this kind executed between 1268 and 1280; one is signed *Petrus civis Romanus*.

Growth of Scholarship

As the study of antiquity progressed and Renaissance art spread and gained strength, its character changed, and free learning and the borrowing from the old monuments gave place to an accurate scholarship which was imposed as a dogma of true art. This stage was reached in Italy in the 15th century. Bramante was the great Italian architect of the culminating period, but a still more accurate scholarship was attained by Palladio. Michelangelo played with his precedents, and Leonardo da Vinci reached emancipation by experiment.

Renaissance architecture was thus in its essence an Italian art, the product of a great movement, nationalist and political as well as artistic. Looking back to the great ancient ruins which strewn their land, it was natural enough that the Italians should worship the forms of classical art, and that all others should be scorned as barbaric. Thus the free art of experimental building became subject to grammars of correct taste; and schemes of proportions were drawn out from the accurate study of the

ruins. Even a special claim to revelation came to be made. Herod's temple, it was said, was built in classical architecture; therefore, it was argued, it had a perfect nature. It was the one true architecture. The conception that there were absolutely perfect building forms and proportions was confirmed to them by the study of Vitruvius, an old Roman architect, who wrote in a rhetorical manner about the beginning of our era.

Predominating Italian Influence

It was thus part of the theory to work within precedents, but very remarkable and splendid results were attained, and while enthusiasm was fully alive the works were very interesting. Many difficulties, however, appeared when this unvarying standard was applied to varying materials and in different climates. What in Italy had been a national movement became in France, England, and Germany anti-national, and the native arts decayed when it became fashionable to esteem only the forms and methods imported from Italy, and characteristic of the movement in that country.

To England small objects and pictures were brought from Italy in increasing numbers during the 14th and 15th centuries, and at the beginning of the 16th several able Italian artists themselves arrived to work for Henry VIII. One of these was Torrigiano, who made the noble tomb of Henry VII in Westminster Abbey, for which he signed a contract in 1512. For a century English craftsmen imitated as best they might the new kind of work which they called antic or antique, and it is interesting to note that our word antics for grotesque behaviour originated in this way. Towards the end of the 16th century Inigo Jones went to Italy to study painting; he returned in 1603, and then designed stage scenery and buildings. Some years later he went again to Italy and acquired a scholarly knowledge of Roman and Renaissance architecture, being the first Englishman to do so. He made a special study of the works of Palladio, and after his return built the Banqueting House at Whitehall, the details of which are closely imitated from the works of Palladio. Jones was followed by an able pupil, John Webb, who built Ashburnham House, now forming part of Westminster School, and several fine country houses.

Christopher Wren came into notice soon after the Restoration, and continued to work nearly until the time of his death in 1723. Wren was an experimenter and an

inventor. Although he acquired a competent knowledge of the grammar of the style in which he worked, his writings show that he looked on this as more or less incidental, and that his interest was in con-



E. Renan

After Bonnat

structive problems and in the larger questions of civic order and dignity, to which he saw a worthy form of architecture was essential. In the next century the fashion of copying Italian works gave way in part to a vain attempt to bring back the Gothic tradition, and English architects entered on another era of copying.

W. R. Lethaby

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Renaix (Flemish *Ronse*). Town of Belgium, in the prov. of E. Flanders. It lies in hilly country, 26 m. by rly. S. of Ghent, and is a rly. junction of importance. There are industries in cottons, woollens, bootmaking, brewing, and trade in local agricultural produce. The town is pleasantly situated and is a summer resort. The 11th century church of S. Hermès, built in the Romanesque style, has a fine crypt. Pop. 22,000.

Renan, JOSEPH ERNEST (1823-92). French philosopher and philologist. Born at Tréguier, Brittany, Feb. 27, 1823, and educated for the priesthood, he left the seminary of S. Sulpice in 1845, diverted from theology by the scholastic methods

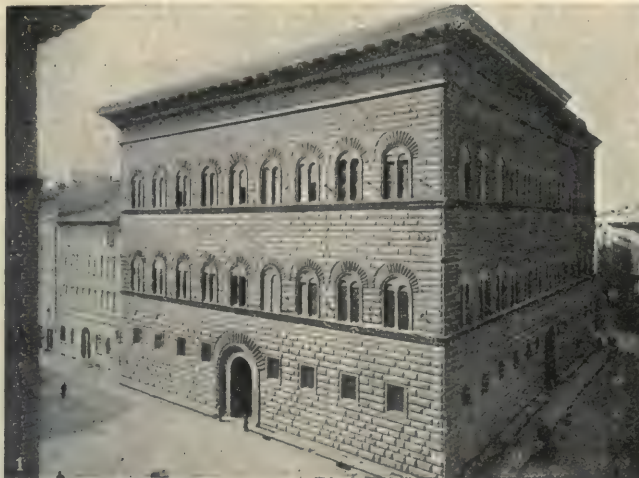
of the time, and devoted himself, with the assistance of his sister Henriette, to the study of letters, and especially to the study of Oriental languages. For a time he was assistant master in a boys' school. In 1850 he secured an appointment at the Bibliothèque Nationale, Paris, and visited Italy. In 1852 came his work on Arabian philosophy, *Averroës et l'Averroïsme*, followed by his *Histoire Générale des Langues Sémitiques*, 1854, *Études d'Histoire Religieuse*, 1856, and *Essais de Morale et de Critique*, 1859.

One of a commission sent by the French government in 1860 to Phœnicia and Palestine, his appointment, 1861, to the professorship of Hebrew at the Collège de France, owing to clerical opposition, was not ratified until 1870. In the meantime he lost by death his sister, Henriette, whose devotion he commemorated in *Ma Soeur Henriette*, 1895 (Eng. trans. Brother and Sister, 1896), and published his best-known work, *Vie de Jésus*, 1863. This work, which formed the initial volume of his *Histoire des Origines du Christianisme*, was written mainly during his visit to Syria. The other volumes of the series deal with Christianity down to the time of Marcus Aurelius.

Later Publications

Renan's other works are *L'Histoire du Peuple d'Israel*, 1888-94; *Dialogues Philosophiques*, 1876; *Drames Philosophiques*, 1888; and *L'Avenir de la Science*, a work of 1878 first issued in 1890. In 1878 he was elected to the Academy; in 1880 he delivered in London the Hibbert lectures on *The Influence of Rome on Christianity*. He married in 1856 a daughter of Ary Scheffer, who died in 1894. Given the cross of the Legion of Honour in 1880, he was made a grand officer in 1888. He died Oct. 2, 1892, and was buried at Montmartre. A statue to his memory, by Boucher, was erected by the French government at Tréguier, in 1903, much against the wishes of the orthodox Roman Catholics of the town.

An emotional romantic, who repudiated the charge of atheism, whose Life of Jesus pained the orthodox believer, and whose *L'Abbesse de Jouarre* was described as an attempt to raise sensuality to the rank of religion, Renan was the greatest French prose writer of his time, and a scholar whose sympathies were as universal as his knowledge was extraordinarily wide, if somewhat lacking in depth. As a philosopher, he took up an attitude of somewhat superior, even ironical, detachment, slurred over rather than



1. Strozzi Palace, Florence, 1489-1536. 2. Fava Palace, Bologna, 15th century. 3. Scuola di S. Marco, Venice, rebuilt 1485-95. 4. Dome of S. Peter's, Rome, designed by Michelangelo and completed in 1606. 5. Old

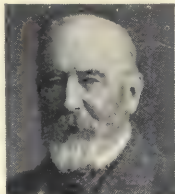
Library, Piazzetta, Venice, 1536-53. 6. Entrance to the Pavillon Sully, Louvre, Paris, early 17th century. 7. West front and main entrance of S. Paul's Cathedral, London, 1710. 8. Façade of Cloth Hall, Brunswick, 1591

RENAISSANCE : EXAMPLES OF THE STYLE OF ARCHITECTURE WHICH SUCCEEDED THE GOTHIC

faced difficulties, and, especially in his later years, was prone to a good-natured acceptance of things as they are. It was said of him that he thought like a man, felt like a woman, and acted like a child. His conversation had all the fascination of his style, which, while vivid and picturesque, is classic in its clarity and its simplicity.

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Rendel, STUART RENDEL, 1ST BARON (1834-1913). British politician. Born July 2, 1834, his father was the engineer, James M. Rendel, F.R.S. He was educated at Eton and Oriel College, Oxford, afterwards becoming a partner in the firm of Sir W. Armstrong & Co. In 1880 he became Liberal M.P. for Montgomeryshire and retained the seat until made a peer in 1894. He died June 4, 1913. Rendel was known as an intimate friend of Gladstone, whose son, Henry, married one of his daughters, and as a supporter of educational and other institutions in Wales.



1st Baron Rendel, British politician

W. & D. Downey

Rendle, ALFRED BARTON (b. 1865). British botanist. Born in London, Jan. 19, 1865, he was educated at S. Olave's Grammar School, Southwark, and S. John's College, Cambridge. In 1888 he was appointed assistant in the botanical department of the Natural History Museum, and in 1906 was made its keeper. He was elected F.R.S. in 1909.

Rendsburg. Town of Prussia, Germany. In the prov. of Schleswig-Holstein, it stands on an island in the Eider, 19 m. W. of Kiel, near the Baltic Sea, and on the Kiel Canal. The Gothic church of S. Mary belongs to the 13th century, and the Rathaus was built in the 16th. The town was founded by the Danes about 1100, and taken by the Swedes in 1643. It became Prussian in 1866. Pop. 17,300.

René (1409-80). Duke of Anjou, called the Good. Son of Louis II of Anjou, he was born at Angers,



René the Good, Duke of Anjou

and Provence, and proved a popular ruler, occupying himself with the arts and literature of his domains and fostering their agriculture, etc. He handed the succession of Aragon to his son John of Calabria (d. 1470), but Louis XI persuaded him, 1474, to bequeath his dominions to Charles of Maine, so that Anjou should revert to the French crown. He died on July 10, 1480, leaving poems, romances, and other writings of considerable merit. His daughter Margaret married Henry VI of England, 1445.

Renegade (Span. *renegado*; cf. *runagate*). One who deserts his principles, more especially one who apostatises from his faith from other than conscientious motives.



Renfrew arms

Renfrewshire, Scotland. It stands on the left bank of the river Clyde, 5 m. W. of Glasgow on the Cal. and G. & S.W.rlys. Formerly a considerable Clyde port, it lost much of its importance, but in the 20th century basins and docks which can accommodate the largest vessels were constructed. Castlehill marks the site of the castle of the Stewarts. Shipbuilding is the staple industry, and

Jan. 16, 1409, and married in 1420 Isabella of Lorraine, whose uncle, disputing the inheritance, captured René at Bulgnéville, 1431. In 1434 René inherited Anjou

engineering, weaving, dyeing, etc., are engaged in. Market day, Sat. Pop. 27,400.

Renfrewshire. County of Scotland. In the S.W. of the country, it is bounded N. and W. by the Clyde, only a small portion lying N. of that river. Its area is 240 sq. m. The surface is generally undulating except in the S., where there are hills. The chief rivers are the Cart, Black and White, tributaries of the Clyde, and Loch Thom is the most important of several lakes. The part of the country that lies



Renfrewshire. Map of the Scottish county south of the Clyde

along the Clyde is an industrial area, and herein are Paisley, Greenock, Port Glasgow, Gourrock, and parts of Glasgow. Elsewhere agriculture is carried on. Renfrew is the county town. The county, which is served by the G. & S.W. and Cal. Rlys., sends two members to Par-



Renfrewshire arms

liament. Renfrewshire was part of Lanarkshire until about 1400. The prince of Wales bears the title of baron of Renfrew. Pop. 315,000.



Renfrew. Town Hall of the Scottish burgh
Valentine

LITERARY ASSOCIATIONS. William Wallace, the great hero of Scottish history and legend, is supposed to have been born at Elderslie, near Paisley. The 16th-17th century Sempills, Sir James, his son Robert and grandson Francis, all of Beltrees, won distinction as writers, Robert Sempill being credited with reviving the verse stave, of which Burns was later to make great use. Robert Pollok, author of *The Course of Time*, was born at Eaglesham. John Wilson (1720-89), author of a "loco-descriptive poem" on the Clyde, was for 20 years master of the Greenock grammar school. Another native of Paisley of the same name is better known by his pen-name of Christopher North. Robert Tannahill, the weaver poet, was born in Paisley, worked and died there, and a bronze statue to him stands in the Abbey burial ground. Alexander Smith, 1830-67, passed his childhood in Paisley, and wrote of his life there in his autobiographical story, *Alfred Hagart's Household*. Robert Wodrow (1679-1734), author of *The History of the Sufferings of the Church of Scotland*, was for over 30 years minister of Eastwood, where he is buried. At Greenock John Galt lived for many years and is buried. Gourcock was for some years the residence of the novelist Neil Munro. See *Description of the Sherifdoms of Lanark and Renfrew*, W. Hamilton, repr. 1878.

Reni, GUIDO (1575-1642). Italian painter. Born at Calvenzano, Nov. 4, 1575, he studied



Guido Reni,
Italian painter

under Denis Calvaert, and with the Carracci at Bologna. Later on he came under the influence of Caravaggio, and for some years followed his naturalistic style; his later work, however, is more voluptuous. Many years of his life were passed in Rome, where Pope Paul V befriended him, but his masterpiece, a *Nativity*, is in the church of S. Martino, Naples, and he ended his career at Bologna, overwhelmed by debts incurred through gambling. He died Aug. 18, 1642. Guido was a most prolific and facile painter and engraver, and is amply represented in English and other European galleries. See *Jesus Christ*.

Renmark. River port in South Australia. It stands on the river Murray, and has weekly steamer communication with Morgan, 74 m.

W., thence by rail to Adelaide. It is a prosperous centre of co-operative fruit growing by irrigation, and was one of the earliest irrigation colonies. Pop. 1,900.

Rennell. Island of the Pacific Ocean. It is 120 m. S. of Guadalcanar.

Rennenkampf, PAUL KARLOVITCH (1854-1918). Russian soldier. Of a good Russo-German family, he was born April 17, 1854, educated at the Staff Academy, St. Petersburg, and entered the Russian army as a lieutenant in a cavalry regiment. He became a colonel, 1896, and a general, 1905, having meanwhile seen active service in China in 1900, and in the Russo-Japanese War, 1904-5. He subsequently published *The Battle of Mukden*, of which there is a French translation. On the outbreak of the Great War he was in charge of the Vilna military district.

At the head of the army of the Niemen he invaded E. Prussia in Aug., 1914, and after some successes was compelled to retreat owing to the defeat of Samsonoff at Tannenberg, but being reinforced, he drove the Germans back from the Niemen, and again invaded E. Prussia. In Oct., 1914, he was transferred to



Paul Rennenkampf,
Russian soldier

the Warsaw front, where he defeated the first German attempt on that city. In Nov., 1914, when the Germans made their second attempt, he failed to cooperate effectively with General Russky, and was retired. He was murdered by Bolsheviks in 1918.

Rennes. Town of France, capital of the dept. of Ille-et-Vilaine, and of the former province of Brittany. It lies at the confluence of the rivers Ille and Vilaine, 232 m. by rly. W.S.W. of Paris, and is a rly. junction. It is the seat of an archbishop, and the headquarters of an army corps, with large barracks and arsenal. Rennes has a university and a national school of agriculture. The industries include tanning, and there are foundries and printing works, and a trade in agricultural produce and livestock.

The chief part of the town lies on the right bank of the Vilaine. The cathedral, an old foundation, was begun in 1787 and completed in 1844. Other churches include those of S. Sauveur, 1725, and of Notre Dame-en-S. Mélaire, a 13th century abbey. The musée contains a notable collection of paintings and drawings by old masters. The palais de justice, built 1618-54, was the meeting place of the old parlement of Brittany.

Rennes was the capital of the ancient Armorican tribe of the Redones. Capital of Brittany in the 9th century, its parlement was instituted by Henry II in 1551. A fire in 1720 destroyed many old buildings. The second Dreyfus trial took place in the Lycée, 1899. Pop. 79,500.

Rennet (Middle English *rennen*, to cause to run together). Extract from the lining of the fourth or rennet stomach of the calf. It is used for curdling milk in cheesemaking. The salted linings used in the preparation of rennet are known as vells. The curdling action is due to the ferment rennin, which causes the casein to coagulate and entangle the fat. Rennet also contains another ferment, pepsin, that plays a part in the ripening of cheese. See *Cheese*.



Rennes, France. Western façade of the cathedral, completed in 1844

Rennie, JOHN (1761-1821). British engineer. Born at Phantassie, Haddingtonshire, June 7, 1761,



John Rennie, British engineer

and educated at Edinburgh University, in 1784 he obtained a position with James Watt, and the same year designed for him a steam engine which was the best till then

produced. In 1791 he began as an engineer at Blackfriars, London, on his own account, carried out the construction of the Kennet and Avon, Rochdale, and other canals, and was responsible for the building or improvement of many docks and harbours, including the London docks, Hull docks, and the dockyards at Sheerness and Chatham, and the great breakwater at Plymouth. Waterloo, London, Southwark, and Kelso Bridges were also all products of Rennie's genius. One of the greatest civil engineers of his time, Rennie was elected F.R.S., 1798, and died in London, Oct. 4, 1821.

His eldest son, George (1791-1866), extended the operations of the firm, adding shipbuilding on a large scale. His second son, Sir John Rennie (1794-1874), was also a distinguished engineer, and constructed works at Woolwich, Sheerness, Plymouth, etc., for the Admiralty. See *Autobiography*, 1875; *Lives of the Engineers*, S. Smiles, 1904.

Reno. City of Nevada, U.S.A., the co. seat of Washoe co. On the Truckee river, it is 32 m. N. of Carson City, and is served by the Southern Pacific and other rlys. It is the seat of the state university, and has a U.S.A. agriculture experimental station. Farming, stock-raising, and mining are important local industries, and the city has manufactures of rly. plant, flour, lumber products, machinery, and plaster. Meat-packing and iron-founding are also carried on. Settled in 1868, Reno was incorporated in 1879, and became a city in 1899. Pop. 13,600.

Renoir, PIERRE AUGUSTE (b. 1841). French painter. Born at Limoges, Feb. 25, 1841, he settled in Paris in 1859, and studied under Gleyre, becoming associated with the Impressionist group. His principal subjects were from contemporary Paris life, but he also painted landscapes, flower studies, and some Algerian scenes. His art, of which there are fine examples in the Luxembourg, is distinguished by movement and gaiety of colour.

Renouf, SIR PETER LE PAGE (1822-97). British Egyptologist. Born in Guernsey, Aug. 23, 1822,



Sir Peter Renouf, British Egyptologist

he studied at Oxford, and became a Roman Catholic, 1842. He was professor of ancient history and Oriental languages in Dublin, 1855, and inspector of schools, 1864. His contribu-

tions to hieroglyphic study, and his Hibbert lectures on Egyptian Religion, 1879, made him Birch's successor as keeper of Egyptian and Assyrian antiquities in the British Museum, 1885-91. Elected president of the Society of Biblical Archaeology, 1887, he translated for its *Transactions* the Egyptian Book of the Dead. He was knighted, 1896, and died in London, Oct. 14, 1897.

Renouvier, CHARLES BERNARD (1815-1903). French philosopher. Born at Montpellier, and educated in Paris, he was mainly influenced by Kant, of whose philosophy his own is a modification. While denying the claim of metaphysics to be considered a science, he opposed the sensualistic materialism of the positivist school. He was a representative of French neo-criticism. He died Sept. 1, 1903.

Renown. British battle cruiser. Launched at Govan in 1916, she displaces 26,500 tons, is 750 ft. in length, with 112,000 h.p., giving a speed of 32 knots. She carries six



H.M.S. Renown. The vessel which carried the Prince of Wales on his visits to Canada, Australia, and India

Cribb, Southsea

15-in., seventeen 4-in., and two 3-in. guns. The Renown conveyed the prince of Wales on his Canadian tour in 1919, his Australasian tour in 1920, and on his visit to India in 1921. See *Fighting Top*.

Rensselaer. City of New York, U.S.A., in Rensselaer co. It stands on the Hudson river, opposite

Albany, and is served by the New York Central and Hudson River, and the Boston and Albany Rlys. It is an important rly. centre, with large workshops, freight yards, etc., and has manufactures of chains, lumber products, felt, and dyes. Settled in 1631, it was, as Greenbush, incorporated in 1815, and became a city in 1897, its name then being changed to Rensselaer. Pop. 10,800.

Rent (Lat. *reddere*, to pay). Money or other payment made for the use of land and also for the use of houses and other buildings. The economist regards rent as the share of production that falls to the lot of the owner of the land, as opposed to wages and interest that fall to the labourer and the capitalist respectively.

According to the theory of rent associated with the name of Ricardo, the amount of rent is fixed by an iron law. There is a class of land on the margin of cultivation, i.e. land which can only produce sufficient to pay for the labour and capital put into it. If any rent is charged, this land will fall out of cultivation. This serves as the basic line for rent, which rises or falls with the price obtained for the produce. A rise in prices will make it possible to cultivate land hitherto lying idle; a fall will have the opposite effect. Rent, therefore, is the surplus obtained from land, the amount it produces in excess of that produced by land on the margin; in other words, it is the difference between the total cost of the product and its value

in the market. It is none the less rent if paid to the cultivator who is the owner, and the principle still holds, even if custom does not allow the landlord to exact the full rent. An application of the same theory accounts for the high rent paid for building land in crowded centres, the so-called ground rent. It is the amount at which a man

values the worth to him of an advantageous position over one that he can obtain for practically nothing.

Ricardo's idea is probably unavailable as a theory, but the intermixture of land and capital is so close that rent tends to approximate more and more to interest on money invested. There are, how-

ever, differences between rent and other forms of income, due to those between land and other forms of capital, and on these are based proposals for the special taxation of rents.

In the popular sense rent is the payment made for the occupation of factories, houses, land, etc., and is therefore only a form of interest on capital. It is regarded as due in England and Wales on the four quarter days. Landlords of small houses usually pay the rates thereon and include this amount in the weekly rent. If the rent is not paid on the appointed day, the landlord has the right of distress without taking the case into a court of law as other creditors must do. In Scotland distress is not permitted, but the law provides other remedies. A rent charge is an income charged by will or settlement upon certain rents. Quit rents are payments made to lords of manors to free the tenant from miscellaneous charges. See Capital; Distress; Interest; Land; Landlord; Single Tax; Tenant; consult also Land and Its Rent, F. A. Walker, 1883.

Rentes. Name given to the main part of the national debt of France. Rentes are the equivalent of the English consols, like which they are bought and sold on the stock exchange. Before the Great War the interest was at the rate of 3 p.c., but in 1915 an issue of *rentes perpetuelles*, bearing interest at 5 p.c., was made. The first issue was sold at 88 francs for 100 francs of stock. Other loans followed, mainly of 4 p.c. rentes. In 1917 a special fund was provided for buying rentes in the open market and annulling them in order to maintain the price. The word is also used for the national debts of Austria and Italy.

Renton. Town of Dumfries-shire, Scotland. It stands on the right bank of the Leven, 2 m. from Dumfarton, with a station on the N.B. and Cal. Joint Rly. The chief industries are dyeing, bleaching, and calico printing, and the chief building is the parish church. Dalquhurn House, now pulled down, was the birthplace of Tobias Smollett, whose family owned land here, and whose sister was the founder of the town. It was named after her daughter, who married a man named Renton. Pop. 5,000.

Rent Restriction. Method adopted during the Great War and afterwards in the United Kingdom to protect tenants from an increase of rent and to safeguard their tenure. It was done by a series of War Emergency statutes begun by the Increase of Rent and Mortgage Interest (War Restrictions) Act,

1915, and concluded by the 1920 consolidating Act of the same title, which repealed all the Acts previously existing. The 1915 Act provided that tenants of dwelling-houses, in respect of which the annual rent or the ratable value, calculated in August, 1914, did not exceed £35 in the metropolitan police district, £30 in Scotland, and £26 elsewhere in the United Kingdom, should have the following privileges: (1) the rent on mortgage interest could not be raised except to meet 6 p.c. of the cost of structural alterations, or a rise in rates when the landlord pays them; (2) any tenant overcharged for rent since Nov. 25, 1915, could recover the excess from his landlord, or deduct it from next rent; (3) no tenant could be turned out so long as he paid rent and performed the other duties of his tenancy, and was not guilty of committing waste or conduct which was a nuisance to neighbours, except if the landlord reasonably required the house for the occupation of himself or one of his employees.

This Act failed largely of its purpose to give security of tenure because of the opening it gave landlords to secure possession for their own or employees' occupation, and in May, 1918, another Act was passed. This deprived those who had bought dwelling-houses within the operation of the 1915 Act since Sept. 30, 1917, of the right of securing possession. With the Armistice of Nov., 1918, the house shortage became even more marked, and the rights of occupying tenants were stiffened up even more by the Apr. and Dec., 1919, Acts, though landlords were allowed to charge a slightly increased rent, and provision was made to counter certain abuses which had grown up at the expense of landlords. The Apr., 1918, Act raised the category of dwelling-houses included in the Rent Acts to £70, £60, and £52 respectively.

Finally, on July 2, 1920, was passed the Act which remained the law of the country until June 24, 1923. This Act raised the categories of dwelling-houses coming within its operation to £105, £90, and £78 respectively. It included business premises within these rentals until June 24, 1921, only. The main points of the Act are:

Landlords of the houses (or flats) coming under the Act may now raise the rent over the standard rent, i.e. usually that existing in Aug., 1914, by 40 p.c., if they do all the repairs, plus 8 p.c. of the cost of structural alterations, plus increase in rates since Aug., 1914.

Any unauthorised increase in rent since Mar. 25, 1920, is recoverable from the landlord. Before rent is increased, necessary repairs or decorations must be done.

Premiums are forbidden under pain of £100 fine, and the same penalty attaches to persons convicted of making an extortionate profit from furnished houses, which are not otherwise affected by the Act. It has been decided by the high court, however, that the assignment of a lease is not within the prohibition as to a premium.

The county court is made the chief tribunal under the Act. County court judges are given almost boundless discretion to refuse ejectment or orders for possession, and have for the most part interpreted this part of the Act in favour of sitting tenants. The court, however, is bound to take into account any claim by a landlord for recovery of possession. A new Act was passed in 1923 modifying that of 1920 and prolonging its operation until June 24, 1925. Under it houses becoming empty were decontrolled. A bill, introduced into Parliament in 1925, proposed to continue rent control for two and a half years.

In addition to these Acts some of the Courts Emergency Powers Acts apply. The 1914 Act debarred landlords from levying distress, or foreclosing, or re-entering into possession in respect of agreements after Aug. 4, 1914, for rentals not exceeding £50, without leave of the court. If such application is made, the court, on the ground of war hardship, may postpone such remedies. See Landlord.

Renwick, James (1662-88). Scottish Covenanter. Born at Moniaive, Dumfriesshire, Feb. 15, 1662, he was educated at Edinburgh and Groningen, Holland, where he was ordained. From 1683 he preached in Scotland, but was outlawed by the privy council of Edinburgh. His open repudiation of the claims of James II to the throne led to his arrest, and he was hanged, Feb. 17, 1688.

R.E.P. Initials of Robert Esnault Pelterie, one of the earliest French pioneers of aeroplane construction, and used to designate machines built and designed by him. In 1908 an R.E.P. monoplane, of all-steel construction, left the ground for a short distance, and by 1911 R.E.P. monoplanes, with R.E.P. air-cooled engines, were among the first aircraft in the world. At the outbreak of the Great War the French army had a number of R.E.P. Parasol monoplanes, which did excellent service in the early stages of hostilities.

Repairs. By English law the liability to execute the necessary repairs to a house is entirely a matter of contract. Cases have been decided to the effect that the tenant is liable to keep the house wind and water-tight; but it is doubtful if this is good law. At any rate, outside this there is no liability in law on either landlord or tenant, except in the case of houses of the working classes. As to such houses, the Housing and Town Planning Act, 1909 (ss. 14 and 15), extending the provisions of a former Act, enacts that in any contract made for the letting of a house (or part of a house) for habitation at a rent not exceeding £40 in the county of London, £26 in a borough or urban district with a last census population of 50,000 at least, and £16 elsewhere, there is an implied condition at the commencement of the tenancy that the house is in all respects reasonably fit for human habitation. Further, there is an implied contract by the landlord that the house shall during the holding be kept by him in all respects reasonably fit for human habitation.

Where a tenant covenants to keep a building in repair, it is implied that he will put it in repair first; and not merely keep it as he found it. The word repair does not include decorative repair, unless so specified; except in so far as painting and the like are necessary to preserve the premises. Tenantable repair means such repair as would satisfy a reasonable tenant, having regard to the class and age of the building. Thus, a landlord or tenant who had agreed to keep a house in tenantable repair would be under very different liabilities in respect of a 100-years-old house and a new house.

In Scotland, the landlord is, in the absence of stipulation to the contrary, liable to repair the house in a reasonable manner, having regard to its age and class. *See* Landlord; Rent; Rent Restriction.

Reparation (ultimately from Lat. *reparare*, to repair). Compensation for loss or damage. The term reparations is applied to the agreement under the treaty of Versailles, by which Germany undertook to indemnify the Allies, and particularly France and Belgium, for material destruction and damage done to property in the occupied areas and elsewhere in the course of the Great War.

Part viii of the treaty, which deals with reparations, is in itself a formidable document, made up of articles 231-247, and of seven schedules, and occupying about 20 closely printed pages. The de-

mands upon Germany took the form of payments in gold and securities, and in material of many different kinds, including huge quantities of coal, livestock, machinery, etc., as well as the replacement of lost shipping, to the extent of all German merchant vessels of 1,600 tons and over, and half those of between 1,000 and 1,600 tons, in addition to many other smaller vessels. New construction up to 200,000 tons a year for a period of years was also to be handed over. The details of all the arrangements, and also Germany's capacity to satisfy the demands in full, were to be examined by an inter-allied commission. From Nov. 11, 1918, to April 30, 1921, Germany made deliveries to the value of £284,500,000, including cash payments, ships, coal, dyestuffs, etc.

The parliament of Great Britain passed a German Reparation (Recovery) Act in 1921, under which British importers of German goods paid to the commissioners of customs and excise such proportion of the value, up to 50 p.c., as the treasury determined. The money so collected was paid into a special fund and applied towards the discharge of Germany's obligations. Later the duty was reduced to 26 p.c. *See* Indemnity; Versailles, Treaty of; N.V.

Repertory Theatre. Theatre with a permanent company of actors, devoted to the performance of an extensive number of plays, old and new, each for a single occasion, or for not more than three or four times in uninterrupted succession. The Théâtre Français (*q.v.*) may be said to be the archetype of the repertory theatre, of which there are many on the Continent. In Great Britain repertory theatres have not had much vogue. The Independent Theatre and The Stage Society (*q.v.*) were pioneer ventures in this direction, and more recent experiments include those made by J. H. Vedrenne and Granville Barker at the Court Theatre, London, in 1904, and at The Savoy, from Sept., 1907, to March, 1908; that of Charles Frohman, at The Duke of York's, in 1910; that of The Manchester Players (*q.v.*), beginning in Sept., 1907, at the Midland Theatre, Manchester; and that of The Irish Players, at the Abbey Theatre, Dublin (*q.v.*). *See* Drama; Stage; Theatre; consult also The Repertory Theatre, a Record and a Criticism, P. P. Howe, 1910.

Repin, ILYA EFIMOVITCH (1844-1918). Russian painter. Born at Chuguev, Kharkov, he studied at the St. Petersburg Academy and in Paris and Rome. He was the

great pictorial historian of Russia under the Romanoffs, painting with a terrible forcefulness the tragedy of what seemed the people's destiny. Burlaki—the men who tow vessels along the Volga—1873, may be cited; The Return from Siberia, 1884, has an even more direct significance. Among his portraits is one of Tolstoy. He died July 17, 1918.

Repington, CHARLES A COURT (1858-1925). British soldier and military critic. B. Jan. 29, 1858, he



Charles Repington,
British soldier
Elliot & Fry

was educated at Eton, and then at Freiberg and Sandhurst. He entered the Rifle Brigade in 1878, and during the next 20 years served in Afghanistan, Burma, and

the Sudan. He spent some time in the intelligence dept. of the war office, after which he was for a short time military attaché at The Hague. During the S. African War he was on the staff of Sir Redvers Buller, but he was soon invalided home. In 1902 he left the army and joined the staff of The Times as military critic, transferring himself to The Morning Post in 1918. Colonel Repington's writings, especially during the Great War, were distinguished for their freshness of style and knowledge of military history. In 1919 he published some Memoirs, and in 1920, The First World War, 1914-1918, which contained his diaries. He died May 25, 1925.

Replevin (Old Fr. *re*, again; *plevine*, warranty, from late Lat. *replegium*). In English law, a personal action to recover possession of goods or chattels taken or detained unlawfully or without sufficient cause. The replevin, or redelivery to the owner of the pledge of the goods taken in distress, is now granted by the registrar of the county court of the district in which it was taken, upon the plaintiff giving security to try the right to the goods forthwith, either in the county court or in the high court, and to restore them to the distrainer if the suit is adjudged against the plaintiff, after which the distrainer may keep them until his claim is satisfied, when he must restore them to their owner. Action of replevin, usually but not solely applicable to distraint for rent, is now almost obsolete, being replaced by action for damages for illegal distress. *See* Distress; Pound; Rent

Report (Lat. *re*, back; *portare*, to carry). Literally, to bring back, but used especially in the sense of bringing back an account of anything, hence reporting for the press, and the report of a company. It means also something in the nature of hearsay. The report of a gun is the sound caused by the explosion. See Artillery; Ballistics; Sound.

Reporting. In journalism, the writing of reports of public speeches or descriptions of events of public interest. Notable examples are the reporting of parliamentary proceedings, trials in the law courts, and cases in the police-courts. The term is applied also to the official reporting of Parliament (see Hansard). Reporters of legal trials are often barristers. Newspaper reporting is of a most varied character, and calls for equally varied qualities on the part of the reporter. Usually, while on country newspapers the reporter finds himself called upon to put his hand to all branches of reporting, on the great daily papers the work is divided among descriptive writers, who specialise in particular branches of the work, and shorthand writers, whose task it is to record verbatim the utterances of public speakers.

Of recent years verbatim reporting has been reduced to a minimum, and confined to the recording of speeches of primary importance or of trials of a sensational character, the formal record of which is introduced by a descriptive summary. The work of the average reporter has consequently changed from a mechanical character, in which accuracy was the chief quality demanded, to one in which the power of succinct descriptive writing is of the first importance. At the same time a knowledge of shorthand on the part of the reporter, though he may not be called upon to practise it very often, is occasionally invaluable. See Journalism; Newspaper; Shorthand; consult also Newspaper Reporting, J. Pendleton, 1890; The Shorthand Writer, T. A. Reed, 1892; The Reporters' Gallery, M. Macdonagh, 1913; The Reporters' Journal and The Reporters' Magazine, monthlies published in London.

Repoussé. Art of ornamenting thin sheets of metal by hammering out designs from the back of the sheet. Practised by the Egyptians and Etruscans, it reached its highest perfection in the 16th century, in the time of Benvenuto Cellini (*q.v.*), the Italian sculptor and craftsman who was perhaps its greatest exponent. In carrying out the art a large number of small

hammers of varying sizes and weights are used, the handles of the hammers being as elastic as possible, in order that they may respond to the lightest touch of the craftsman. When the design has been hammered out from the back or the inner surface of the article, the raised portions are generally finished by gravers or chasers. As the metal usually has been hammered out very thin, a backing of pitch is attached to provide a firm bed for the engraver to work upon. The metals which have chiefly been used in the practice of this art are gold—which is peculiarly suitable—silver, copper, tin, and lead. Beautiful examples of repoussé

cratic government throughout the civilized world.

Representation in the modern sense was unknown in the civilization of the ancients. There the citizen and freemen acted, whenever necessary, in person, but if a choice had to be made, it was usually done by lot or went by seniority. Kings and priests may be said to have represented the people, but not in the modern sense of the word.

The existing system began probably in assemblies of the Church, and appeared very soon in the secular affairs of Teutonic peoples. In England the reeve and four men were summoned from each



Repoussé. Shield of hammered iron, Augsburg work of 1552. In the centre is the Medusa's head, and round the edge are a series of figures representing the apotheosis of Rome

work are to be found in the museums at S. Kensington, London. See Ewer; Phoenicia; consult also A Manual of Instruction in the art of Brass Repoussé, T. J. Gawthorpe, new ed. 1907.

Representation (Lat. *re*, again; *praesentare*, to present). In politics, the method by which people entrust the duties of legislation and government to men and women of their choice. In theory it gives them a greater freedom of action than is enjoyed by mere delegates or the holders of proxies. The representatives, as they are called, are chosen by election in which the vote of the majority is decisive, and institutions based on this principle are the foundation of demo-

vill to answer for the state of that community, and the principle was quickly extended. The jury was representative, and then came the summons of knights of the shire to Parliament and, a most important step, their election to the county court. These were representatives, although the word itself was not used for them until after 1600. About the end of the 18th century the ideas of the French Revolution gave new form to the theory of representation, and in the 19th century almost every kind of local authority became a body of elected representatives. Previously, the justices of the peace had been representatives, although not elected ones, and before that time the lords

of feudal times had represented their vassals before the king or other overlord.

Most European nations, beginning with France and Spain, followed England in making use of political representation, while the system was carried by Britishers into all the countries in which they settled.

The word is also used in other senses. One allied to the main one is for an ambassador or envoy of any kind who goes to act for his country abroad. Representation is used for an image or picture; also for a dramatic performance, and for a statement, usually in the nature of a remonstrance. See Democracy; Election; Government; Politics.

Representation of the People Act. Official designation of the Act passed in 1918 amending and extending parliamentary suffrage in the United Kingdom, and effecting a redistribution of seats. Its chief provisions are outlined with those of the other Reform Acts. See Redistribution; Reform Acts.

Representatives, HOUSE OF. Lower house, or popularly elected house, of the Congress of the U.S.A. Its membership varies in number from time to time, being settled every ten years on a population basis. In 1910, by the census, it was fixed at 435, or one for every 212,407 inhabitants. An election takes place every two years, the qualifications of the voters varying from state to state, women voting in some of them, while the necessary period of residence varies. Members of the House must not be under 25 years old, and must reside in the state which chooses them.

The House is presided over by a Speaker, and all legislation must be approved by it; but it differs from the British House of Commons in excluding from membership all who hold ministerial office. Members receive a salary of 7,500 dollars (£1,500) a year and travelling expenses. They are divided into parties, mainly democrats and republicans.

The elected chamber in the Parliament of the Australian Commonwealth is also called the House of Representatives. It consists of a varying number of members, regulated according to the most recent census, but no state can have fewer than five. In 1911 the members were: New South Wales, 27, Victoria 21, Queensland 10, South Australia 5, Western Australia and Tasmania 5 each. They are elected for three years unless the House is dissolved earlier. Some of the representative assemblies set up in New England states in the 17th

century were called by this name. See United States.

Reprieve. In law, withdrawal of the sentence on a prisoner for an interval of time whereby the execution is suspended (Blackstone). This may be done by the judge when he is not satisfied with the verdict or with the legality of the conviction. A reprieve is granted as of right to a woman who is capitally convicted, and who, on pleading pregnancy, is found by a jury of matrons to be quick with child. It is also granted in all cases where the prisoner becomes *non compos mentis* between the judgement and the award of execution. There is another form of reprieve, by the royal grace, which is part of the king's prerogative of pardon, and in every country the head of the state has the power of reprieve by way of grace. See Pardon.

Reprisals (Fr. *représailles*, ultimately from Lat. *reprehendere*, to take again). Retaliation or vengeance taken upon an enemy. The law of retaliation or *lex talionis*, which demands an eye for an eye and a tooth for a tooth, is as old as human history, and when the passions of war are aroused it is still operative, though repudiated, in theory at least, by all thoughtful minds as futile in the long run. Reprisals take many forms. They may consist of confiscation or destruction of enemy property on land or sea (see Letter of Marque), ill-treatment or deliberate exposure to danger of prisoners of war, bombing of towns from the air, shooting of civilians in cold blood, etc.

Civilization is a flimsy barrier to the employment of reprisals, as the experience of the belligerent countries during the Great War and succeeding years proved, though how far, in certain circumstances, they may be effectual in checking the commission of atrocious crimes by the enemy is a point which has raised considerable discussion.

Reproduction. Biological term expressing the act or process by means of which new organisms are produced from pre-existing individuals. It also includes the whole chain of events as the result of which life is continued from one generation to another. In all the higher animals reproduction is sexual, the individuals of each species falling into two groups having very different characteristics, male and female respectively.

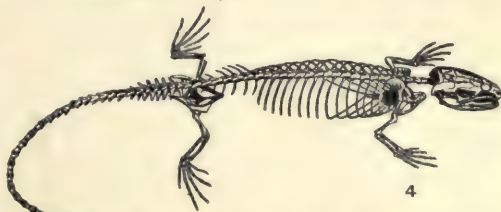
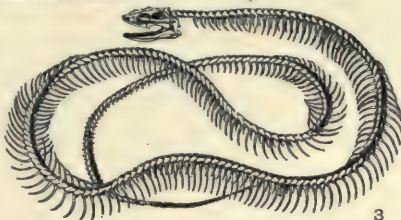
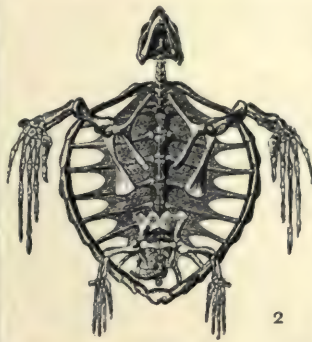
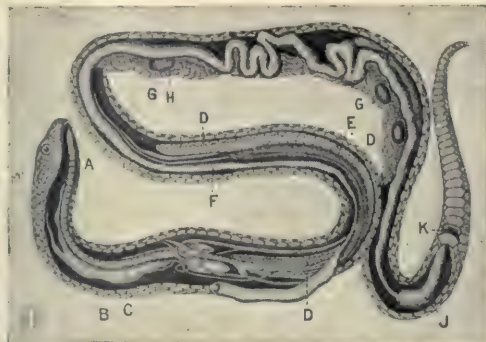
It is quite obvious that this division of the individuals of a species has reference to the process of reproduction. The mental instincts in the sexes after adolescence is reached result in actions by means of which there takes place the

union of a sperm from the male with an ovum from the female, and this being followed under suitable conditions of nourishment and protection for the fertilized ovum in the body of the female, reproduction is the result. This method of the continuation of life from one generation to another is so obvious in all the higher animals that other methods of reproduction are apt to escape notice. It is important, therefore, to realize at once that this conjugation of the sexes is by no means necessary in order that new individuals may be produced.

In some cases, in both plants and animals, the process of reproduction is entirely parthenogenetic, no males having ever been observed. In most uni-cellular organisms conjugation does not seem to occur, and even when it does it is apparently an exceptional case, there being always long intervals in which the reproduction takes place asexually. When the process of reproduction is parthenogenetic the offspring reproduce the parental characters with some slight variations; but when reproduction is sexual the process is much more complicated, and the problems of inheritance of characters much more complex. It must be remembered in this connexion that the male and female individuals of the higher orders of animals, even though they have a certain number of characteristics in common, have others in which they differ greatly.

Inasmuch as the new individual which results from the process of reproduction is either male or female, it follows that it will have the characters of only one of the sexes, in so far as those characters are sexual. The other set of characters, if present, will be rudimentary. Thus, for example, in human male individuals the sexual development of the breast is absent, though the structure is present in a rudimentary form. When only one of two possible characters or set of characters is produced in reproduction the process is termed alternative reproduction.

Most biologists believe that the function of sex in the process of reproduction is to mingle the characteristics of both parents. As to the nature and effect of this mingling, however, there is much room for argument. See Abiogenesis; Agamogenesis; Alternation of Generations; Biogenesis; Biology; Gemmation; Life; Mendelism; Pangenesis; Parthenogenesis; Recapitulation; consult also The Cell, O. Hertwig, Eng. trans. M. Campbell, 1895; Problems of Life and Reproduction, M. M. Hartog, 1913.



Reptile (Lat. *reptilis*, crawling) Class of back-boned animals (Vertebrates) with cold blood, which breathe air by means of lungs and are reproduced by eggs, which are sometimes retained in the body until ready to hatch. The class consists of five existing orders, but fossil reptiles constitute as many more orders. Of existing orders one is represented solely by the iguana-like *Tuatara* (*Sphenodon*) of New Zealand, the second by the tortoises and turtles, the third includes the crocodiles and alligators, the fourth the lizards, and the fifth the snakes. Formerly the amphibious animals (*Batrachia*) were classed as reptiles, as they are still re-

With the exception of some herbivorous tortoises, all the reptiles are carnivorous, their food ranging from mammals to insects and worms. In the turtle and tortoise the upper and under sides are protected by great shields, formed by modifications of the skeleton and covered with thin plates of horn. In the crocodiles ordinary scales are more apparent on the feet; on other parts there are bony plates formed in the skin. In the lizards and snakes the scales are mostly small, horny, and overlapping, outgrowths from the skin, with which they are shed from time to time. See Animals, colour plate; also Chameleon; Crocodile; Gecko; Iguana; Lizard; Snake, etc.

Reptile. 1. Viscera of a serpent: A. Mouth. B. Gullet. C. Trachea. D. Lung. E. Liver. F. Stomach and intestine. G. Egg. H. Ovary. J. Cloaca. K. Vent. 2. Skeleton and carapace of a logger-headed turtle, from beneath. 3. Skeleton of a snake. 4. Skeleton of common lizard



garded in the popular view; but the soft glandular skin, devoid of scales or plates, and the fish-like larval stage separate them. The skull is bony, and the jaws furnished with teeth, except in the turtles and tortoises, where they approximate more to a bird's bill.



Repton, Derbyshire. School buildings, with remains of priory on left, and Pears School, built in memory of former headmaster. Top, left, parish church of St. Wystan

Valentine

Repton. Village of Derbyshire, England. It is 5 m. from Burton-upon-Trent, with a station on the Mid. Rly. Here the kings of Mercia had a palace. The place had also a famous nunnery, in which some of the kings were buried. This was destroyed in 873 by the Danes. The church of St. Wystan, which was built early in the 14th century and restored in the 18th and again in the 19th, has a crypt and other remains of an earlier Saxon building. Some buildings of the monastery, which was founded in 1172, now form part of the school, and the hall is the headmaster's residence. Pop. 1,900.

Repton School. English public school. It owes its origin to Sir John Port, of Etwall, who left money to found a grammar school, and this was opened at Repton, Derbyshire, in 1557. In the 19th century it developed into a leading public school, and has now about 400 boys. They live in eight houses, and there are classical and modern sides, as well as an army class, and other kinds of special training. The school has entrance scholarships, and several to assist those leaving the school to enter the universities.



Repton School arms

Republic (Lat. *res publica*, public affairs). Form of the state in which the supreme authority is vested in the citizens, or a privileged class of citizens. It is thus opposed to a monarchy, the head of which derives his power from hereditary descent. The distinction is not always rigidly maintained,

for the elective monarchy of Poland was called a republic.

The city-states of the ancient world were mostly republics, which generally succeeded earlier monarchies. Some were aristocratic and some democratic, i.e. the politically privileged classes were small or large, but none were democratic in the modern sense, there being no representative machinery, and large classes—slaves, resident aliens, and others—being without political rights.

The weakness of the medieval empire allowed the rise of republican city-states in Italy, of which the strongest was the close oligarchy of Venice, and the most brilliant and turbulent the democracy of Florence. At the same time city republics arose in Germany and the Low Countries, and formed federations, notably the Hanseatic league, three members of which, Hamburg, Lübeck, and Bremen, maintained the medieval type in a modified form until modern times. San Marino and Andorra are two other remarkable survivals. More democratic, although often tending to oligarchy, were the Swiss cantons, which in the 14th century formed a federation, the model of the modern federal republic.

The republic of the United Provinces of the Netherlands, 1581, set an example followed by the British Commonwealth, 1649. Both, however, adopted hereditary rule, in the houses of Orange-Nassau and Cromwell respectively, thereby ceasing to be truly republican. The modern democratic republic begins with the adoption of federal republicanism by the British colonies in North America, 1776, soon followed by the centralized French republic, 1793, which, while itself passing into the Napoleonic empire, endeavoured to found daughter republics in other countries. The U.S.A. and France consciously imitated the austere simplicity belonging to the republican traditions of ancient Greece and Rome. Latin America followed the U.S.A. with republican constitutions, some federal, others centralized.

A period followed in which the monarchical principle gained ground, though Brazil became a republic in 1889, Portugal in 1910, and the venerable Chinese empire transformed itself, nominally at least, into a federal republic of the American type in 1912. The Great War, with the collapse of the continental empires, made Europe and the world predominantly republican, federal republics being established in Germany and Austria; centralized republics in Poland,

Czecho-Slovakia, Finland, the Baltic States, and the Caucasus; and an entirely new type, the Soviet republic, in Russia and her remaining dependencies. See Democracy; Federalism; Government; Oligarchy; Politics; Soviet.

Republican. River of the U.S.A. Formed by two forks in E. Colorado, it follows a N.E., E., and S.E. course, uniting with the Smoky Hill River at Junction City to form the Kansas River. It is more than 500 m. long.

Republican. Political party in the U.S.A. The party organized by Thomas Jefferson was the first to bear this name, though it became afterwards the Democratic one. Between 1825 and 1830 this was a Republican party, but the existing one dates from the anti-slavery agitation. It developed from a union of Whigs, Democrats, and others, men who were against the extension of slavery, and the name republican was adopted in 1854.

The party secured the election of Lincoln as president in 1860. It controlled American politics to the full extent of electing a president and dominating the Senate and the House of Representatives until 1874. The control of the latter house was lost in 1874, but the Republicans kept their hold upon the presidency until the election of Cleveland, a Democrat, in 1884. From 1888–92 they were again in power, but they were beaten in 1892. In 1896 the party had majorities in both houses of Congress, and their candidate was elected president. In 1904 their candidate, Roosevelt, was again successful, as was Taft in 1908. In 1912 Roosevelt and his followers broke away from the party and enabled the Democrats to bring about the election of Wilson and to obtain a majority in both Houses. The Democrats remained in power until the return of the Republican Harding (*q.v.*) in 1920.

The leading features of the Republican programme have been the strengthening of the central government as against the local spirit of the separate states; the maintenance of a gold standard; the recognition of the republic as a world-power rather than a nation in self-contained isolation; and the protection of American manufactures by a tariff system.

Repudiation (Lat. *repudiare*, to cast off). Act of rejecting or discarding anything. It is sometimes used for the act of sending away a wife, and in ecclesiastical law means a refusal to accept a benefice. Another use is when a state refuses to acknowledge its debts; usually, this is a repudiation by

one government of liabilities contracted by an earlier one.

Requeña. Town of Spain, in the prov. of Valencia. It stands on a hill, 25 m. direct and 47 m. by rly. W. of Valencia. It has relics of the old town walls, and a church dating from the 13th century. Silk worms, vines, cereals, fruit, and saffron are cultivated. In the vicinity are the mineral baths of Fuente Podrida. It was taken by the British in 1706, and retaken by the French in the following year. Pop. 16,000.

Requests, COURT OF. Ancient court of equity intended for the relief of persons who addressed the sovereign by petition. It was composed of privy councillors, and was abolished by the statute 16 Charles I, which also abolished the Star Chamber. Court of Requests was an alternative name for tribunals intended for the recovery of small debts, and otherwise known as courts of conscience (*q.v.*). These were abolished on the institution of county courts, 1846.

A letter of request is a document used in proceedings under the ecclesiastical law of England. It is addressed from a diocesan court to another ecclesiastical tribunal, such as the court of arches (*q.v.*), asking that a cause may be instituted in the latter court.

Requiem. Name given to the Mass for the dead (*Missæ pro defunctis*), the word being the first of the introit of this office—*Requiem æternam dona eis, Domine*—Grant to them eternal rest, O Lord. The requiem mass, which is sung on All Souls Day, Nov. 2, is celebrated with black vestments, and the Credo and Gloria in Excelsis are omitted. Music for sung requiems has been written by many great composers, among the most celebrated being those of Palestrina, Vittoria, Mozart, Cherubini, Berlioz, Brahms, and Verdi.

Reredos (rear; Fr. *dos*, Lat. *dorsum*, back). In ecclesiastical architecture, the screen or wall at the back of an altar. Originally it was merely a hanging of silk or tapestry suspended from hooks in the walls or ceiling of the sanctuary, and in this form it was subject to frequent changes, corresponding to alterations in ritual. In the Middle Ages it became more substantial, but was still movable; it was customary to use it only for certain festivals of the year. The Pala d'Oro, in S. Mark's, Venice, is a reredos of this description. With the middle of the 16th century, the fixed reredos came into use.

In England it assumed early a more definitely architectural character, and was covered with

elaborate Gothic detail—niches with figures of angels or saints, tabernacle work, and symbolic carving of every kind. The 14th century reredos in Durham Cathedral, the 15th century example in the chapel of All Souls, Oxford, and the one at Winchester may be cited. See Altar. *Pron.* rear-doss.

Reschen Scheideck. Alpine pass of the Italian Tirol. On the road from Landeck to Meran, alt. 4,902 ft., the pass is near the village of Reschen, and $3\frac{1}{2}$ m. S. of Nauders, near the Gruben Joch, where Austria, Switzerland, and Italy meet. The road is often called the Finstermünz Pass, but this point lies some 2 m. N. of Nauders. The route was known in pre-Roman times.

Rescript (Lat. *rescripta*, written back). In Roman law, a written answer sent by the emperor to magistrates and other officials who applied to him for information and advice, and, less commonly, to parties in a litigation who similarly appealed to him. They differed from *decreta*, which were decisions upon doubtful points of law referred to the emperor as the highest court of appeal, but with the *decreta*, the *edicta*, ordinances with regard to matters in which new legislation seemed to be required, and the *mandata*, instructions to magistrates, formed the four classes of *constitutiones principum*, imperial constitutions, which had the force of law. The rescripts were preserved by Justinian in his Institutes. Rescript is the technical term for a decretal epistle from the pope on points of doctrine or discipline. See Decretal.

Rescue (Lat. *re*, away; *excutere*, to shake out). Deliverance from danger or violence. It is used for the forcible release of a prisoner which is an offence against the law, and also to relief from a violent death. Rescue appliances are those provided in case of an explosion in a mine or disasters at sea, while fire brigades come under the same category. (See Fire Brigade; Life Saving; Rocket.)

Rescue work is a term used for the efforts to dissuade women from the career of prostitution. A great deal of it is done in large cities by the Salvation Army and

other social and religious agencies, and there are many houses where fallen women, as they are called, are received and looked after.

Rescue. In law, the taking away and setting at liberty out of the custody of the law either a person who is in the custody of the law or a distress rightfully taken. Rescue is a misdemeanour. But if a private person arrest another, it is no offence to rescue him unless the rescuer has notice (knowledge) that the person rescued is lawfully in the custody of such private person. The form in old English law-books is *rescous*.

Research. Literally, a careful examination of facts. It is carried out by scientists, historians, and other scholars, and universities give research scholarships and fellowships for this purpose. See Laboratory.

Research Defence Society. Society established to make generally known the facts as to experiments on animals in Great Britain, the regulations under which they

are conducted, and the great importance of such experiments to the welfare of mankind. The office of the Society is at 11, Chandos Street, Cavendish Square, London, W. See Vivisection.

Resedaceae. Small natural order of herbs. They are natives of Europe, W. Asia, and Africa. They have alternate leaves, and the small flowers are in spikes or sprays. The fruit is a leathery capsule open at the top, containing numerous kidney-shaped seeds. The typical genus *Reseda* includes the well-known garden annual, mignonette (*R. odorata*), with fragrant flowers, native of N. Africa. Dyer's-weed or weld (*R. luteola*), a native of Europe, W. Asia, and N. Africa, yields a yellow dye.

Reservation. Act of keeping back something which, added to a statement, would considerably qualify the meaning. The statement may be true as far as it goes, but it is not the whole truth. Thus,



Reredos in Winchester Cathedral, probably begun by Cardinal Beaufort in the 15th century, and restored and furnished with new statues, 1884-91

"I will pay to-morrow" implies payment in full, but the speaker may have made the mental reservation "in part."

Reservation of the Sacrament. Name given to the act of retaining unconsumed a portion of the consecrated elements at the Eucharist for future use. The earliest reference to such a practice is found in Justin Martyr (A.D. 150), who tells us that the deacons reserved "some of the Eucharistic bread and wine" for the use of members of the church who were not present at the communion service itself. Tertullian encouraged the custom, especially in cases where any reason existed (e.g. the necessity of fasting on certain days) for not partaking of the elements at the actual service.

The object of the reservation was to provide (1) for the needs of the sick, since in the absence of any order for private communion in early times they would otherwise have been deprived of the Sacrament; (2) for those who lived in isolated districts, where, owing to the absence of a regular priest, the Eucharist was infrequently observed; (3) for those who were prevented by persecution or other lawful cause from attending the Eucharist itself.

The Council of Saragossa in 380 declared that "whosoever does not consume the Holy Eucharist given to him in church" is anathema. This prohibition, however, seems only to have referred to private individuals, and the custom of the clergy to reserve the Sacrament for the sick, and for use in sudden emergencies, seems to have been universal. At the Reformation, Protestantism for the most part abandoned the practice. Article XXVIII of the Church of England declares that "The Sacrament of the Lord's Supper was not by Christ's ordinance reserved, carried about, lifted up, or worshipped." Attempts have been made in modern times to revive the custom, but the court of the archbishops refused its sanction in 1899 by decreeing that "the Church of England does not allow reservation in any form." See Eucharist.

Reserve (Lat. *re*, back; *servare*, to keep). Literally, anything kept back. Funds kept over and above the usual requirements by banks and business houses are known as reserves. The term is used also in a military sense for troops kept back during an action for reinforcements or to use in case of emergency. It is usual for the commanders of units, brigades, divisions, etc., to keep reserves, which are known as local reserves, while there is also

a general reserve under the direct orders of the commander-in-chief. The throwing in of the reserves marks a critical stage in a battle.

Reserve is also used for the sailors and soldiers who have passed through the ranks, but are liable to be called upon for active service in time of war. These men are called reservists. In the United Kingdom the name special reserve was given to the militia in 1907. There are reserves for the army, the navy, and the air force, and the army has a special reserve of officers. The navy usually maintains a reserve fleet. In April, 1921, the army reserve was called out, as a general strike was threatened. European armies have reserves composed of men who have passed through the ranks of the regular army. In sport the term reserve is also used for a spare man. A reserve team in football is one upon which the premier team can draw for fresh players. See Army, British; Army Reserve; Landwehr; Landsturm; Naval Reserve, Royal; Special Reserve.

Reservoir (late Lat. *reservatorium*). Construction for the storage of water. Reservoirs are of three kinds: impounding reservoirs, formed by damming the course of a stream and creating a lake, or increasing the size of one already existing; storage reservoirs, into which water is pumped, or conveyed by an aqueduct, to deposit suspended matter; and service reservoirs, for filtered water. The last are generally of comparatively small size, covered in, and situated at a sufficient height above the area served to give a good pressure in the mains taking water from them.

Impounding reservoirs, used either for irrigation or town supply purposes, are designed to collect a large part of the surface water from an extensive catchment area, the average rainfall on which during a period of years has been carefully observed. Lake reservoirs formed by dams are of enormous capacity. The Nile and the Roosevelt (U.S.A.) dams impounded 450,000 million gallons each; the Marikanave dam (in India), 245,000 million; the Shoshone and the Olive Bridge dams (U.S.A.), 150,000 and 127,000 million respectively.

Some storage reservoirs are formed by damming a valley or depression, but more commonly are wholly artificial. Staines and Chingford reservoirs of the London metropolitan water board, holding 3,000 million gallons each, are the largest examples of artificial reservoirs on level land. The

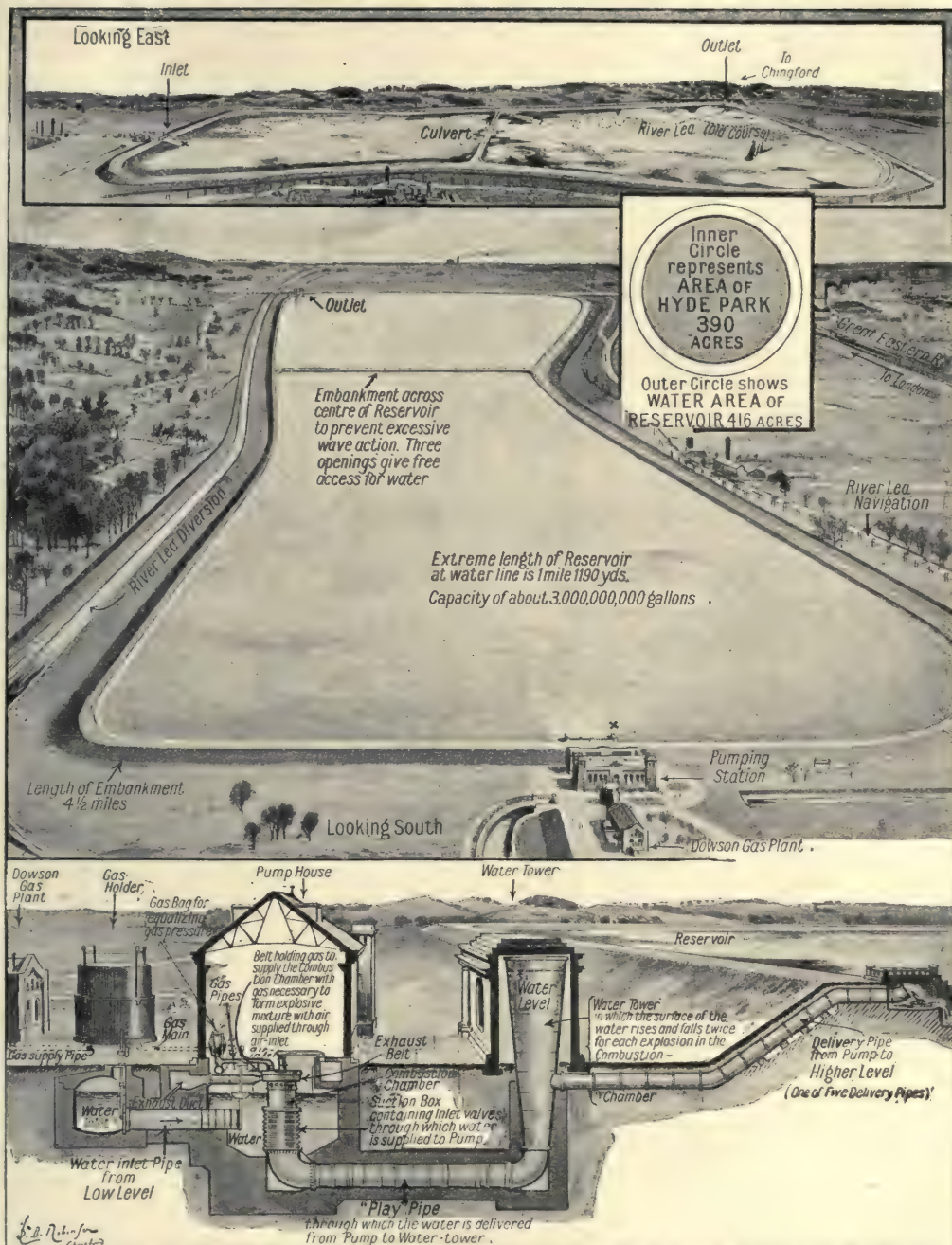
containing embankments have core walls of puddled clay carried down to an impermeable stratum, and are constructed of material excavated from the area enclosed. The engineer balances the excavation against the embankment, removing only sufficient material for his purpose, while shaping the bed to throw all the water towards the outlet. Provided that the bed be self-draining, it need not be flat.

Service reservoirs for towns are lined with concrete or masonry and, in most cases, covered in to protect the water, which has been purified in filter beds, from contamination. The largest covered reservoir in England is that at Honor Oak, in S.E. London, which has an area of ten acres and a maximum depth of 34 ft. The sides are retaining walls, backed by puddled clay. The whole of the bottom is covered by inverted arches of concrete, crossing one another at right angles. At the points of intersection rise brick piers, which carry continuous brickwork arches running N. and S. and coated outside with a thick layer of cement. Above the cement is the clay and top soil originally taken from the site. At the point of intersection of two walls, which divide the reservoir into four parts, are the valves by which water is admitted to and drawn off from each section independently.

One of the important factors to be considered in the construction of a reservoir is the maintenance of a sufficient supply of water during periods of drought. This particularly applies to reservoirs which depend entirely upon the rainfall in a certain catchment area, and allowance is usually made on the assumption that there will be three consecutive dry years. Such years are those in which the rainfall is only four-fifths of the average. Other meteorological considerations and geological factors enter into the question, e.g. the maximum and minimum rainfall, etc. The height of the catchment area determines to a large extent its area, e.g. the larger areas are at lower elevation. See Dam; Hydraulics; Metropolitan Water Board; Water Supply.

Reset. Term used in Scots law. It means the receiving and harbouring of a criminal; it refers also to the act of receiving stolen goods, knowing them to be stolen.

Resht or **RASHT**. Town of Persia. The capital of the province of Gilan, it is about 150 m. N. of Teheran, with which it is connected by a fair caravan road. Silks are manufactured, and cattle, sheep, tobacco, rice, and fruit exported.



Reservoir. Diagrams of the Chingford reservoir which helps to supply London with water, showing how the river Lea is diverted, and the system of pumps which raise the water from the river level to that of the reservoir

During the Great War it was occupied by the British in Aug., 1918, and in Oct., 1920, by the Bolsheviks. Pop. 40,000.

Residence (Lat. *residere*, to sit down). Word used in several cognate senses. (1) Dwelling-place; (2) in ecclesiastical law,

residence is the condition on which an incumbent holds his benefice; (3) in international law, the official residence of a resident (*q.v.*) is called the residency; this latter term is also applied to an administrative area in protected states, *e.g.* in India, Java, etc.,

controlled by a resident agent. See *House*; *Incumbent*.

Resident. Diplomatic officer appointed to the capital of a state bound by certain obligations to the country to which he belongs. The sovereigns of such states, though nominally independent, are guided

in their international action, and sometimes in domestic affairs, by the advice of the resident. There are British residents at the courts of the principal Indian princes, and Sir Evelyn Baring (Lord Cromer) practically administered Egypt, though he held only the title of H.M. resident and consul-general.

Residential Club. Club where members may have permanent board and residence. The movement for residential clubs for women received a great impetus during the Great War, when large numbers of women, for whom accommodation had to be found, were employed in government offices and in other war work at a distance from their homes. Certain prominent ladies' clubs have for many years provided bedrooms which are available for a limited period to members, but the residential club strictly so called provides permanent residence (if desired) for women who have enrolled themselves in the club. There were several notable examples in London before the war.

In practically all cases the basis was that of a public utility undertaking. They varied from a standard of reasonable hotel prices and a corresponding standard of living down to clubs for working girls. During the war several new large residential clubs were opened, some of them under the auspices of the Young Women's Christian Association, in some of which lodging and partial board (full board except lunch) was provided at from 18s. to 22s. a week for government clerks and others.

Residue (Lat. *residere*, to remain behind). That which is left, the remainder. The word is used in connexion with wills and bequests. In English law, a residuary legatee is the person to whom a testator bequeaths the rest or residue of his personal estate after satisfying particular bequests. A residuary devisee is the person to whom a testator gives the rest of his real property, after satisfying all the claims of particular, or specific, devisees, and after satisfying all other claims on his real estate. *See* Will.

Resilience. In engineering, name given to the work done in producing stress in a body within its elastic limits, or the work done by the body in regaining its original form. Thus, if 13 tons per sq. in. be the elastic limit of stress for a steel bar, and if the bar be subjected to any stress below 13 tons per sq. in., it will be temporarily deformed. It will, however, elastically recover its original shape and size when freed from

stress, but if the elastic limit of stress be exceeded, the bar will be permanently deformed. The modulus of resilience of a material is a measure of its capacity for resisting shocks or blows.

Resin (Lat. *resina*). Name given to certain vegetable and mineral substances consisting entirely of various combinations of carbon, hydrogen, and oxygen.

Nearly all resins are translucent solids at normal temperatures, occasionally transparent, usually aromatic, and melt easily. They are soluble in alcohol, oils, etc., and insoluble in water. Resins are divided into two broad classes, oleo-resins and gum resins. The former contain volatile aromatic oils which are driven off by distillation, and the latter gummy and mucilaginous substances which may be removed by dissolving in alcohols.

The resins of commerce are chiefly vegetable resins, e.g. common resin or rosin, obtained from various species of pine trees by making an incision in the stem and collecting the flowing juices. Amber is a fossil coniferous resin.

Resins are used in varnishing, lacquer work, in the manufacture of soap, waxes, printing inks, greases, as antiseptics, as adulterants of many substances, etc. They are contained in balsam, and from the crude resin obtained from pines turpentine is distilled. *See* Amber; Balsam; Gum; Lacquer; Turpentine; Varnish.

Resina. Town of Italy, in the prov. of Naples. It stands on the Gulf of Naples, adjoining Portici (*q.v.*) at the S.W. base of Mt. Vesuvius, and is built on the lava streams covering Herculaneum (*q.v.*). The starting place of the electric rly. ascending the volcano, it has trade in the famous Lacrima Christi wine made from the vines grown on its slopes. Pop. 20,000.

Resistance. Term used in electricity. The resistance of an electric conductor is the measure of the extent to which it resists or opposes the passage of an electric current. The practical unit of resistance is the ohm. The resistance of a conductor varies according to the material of which it consists; of all practicable conductors copper offers the least resistance to the current flow. In proportion as resistance increases, heat in the conductor is developed, and the electromotive force of the current is lowered. In a conductor of uniform section throughout, the total resistance increases directly in proportion to its length, but decreases in proportion as the cross-sectional area of the conductor is increased. In another

sense, resistance is any object interposed in a circuit which develops or opposes resistance to the current flow. Such are a number of coils of wire, connected in series, inserted in a circuit for the express purpose of increasing resistance.

Each coil is connected to a terminal with a contact stud, and by moving a switch lever from one stud to another any or all of the coils in series may be connected up to the circuit; by this means the resistance may be varied. One of the applications of resistances is in the starting up of motors; if the full current were allowed to traverse the armature winding at starting, the heat developed would cause injury, and resistances are therefore inserted to prevent a full rush of current. By moving over the switch lever the resistances may be cut out step by step until the motor is running up to speed. Spurious resistance is any resistance in a circuit which exerts a counter electromotive force, such as self-induction. It differs from true resistance in that no heat is developed or dissipated. *See* Electricity; Electric Power; Electric Transmission.

Res judicata (Lat., thing judged). Term in general use in law. It means a dispute or matter which has been finally and decisively adjudicated upon by a competent court, so that it cannot be reopened. It is a matter of high legal policy that when once a question has been tried and finished it shall not be reopened; otherwise there would be no end to litigation. The plea of *res judicata* is conclusive; but it only applies when the person who brings a fresh suit is really trying to rake up the identical matter that was determined in the previous case. *Res Judicatae* is the title of a book of essays by Augustine Birrell (*q.v.*).

Resolution. Literally, something that is decided upon, and therefore meaning determination and steadiness. In a narrower, but derived sense, the word is used for a proposal put in definite terms before a public meeting or a committee. The House of Commons sometimes declares its will in resolutions, but these are not laws until embodied in an Act of Parliament. *See* Chairman; Meeting, Public.

Resolution. In music, the necessary progression of a discord to an adjoining note so as to complete the grammatical sense. Here F is the discord which resolves upon E. The term is also applied to the progression of the chord containing the discord.



Resonance (Lat. *resonare*, to sound back). Production of vibrations in a body by the action of a periodic force which has the same period of vibration as the natural period of the body. It occurs frequently in sound. If, for example, two tuning forks of the same pitch are held near the other, and one is sounded, the sound waves sent out by it will strike the second fork, and cause the latter to vibrate in unison.

Resonators are commonly used to increase the amount of the sound of the particular pitch to which they respond, by increasing the amplitude of the sound waves. The sound of a tuning fork may be increased by a resonator. The resonator employed for this purpose is a pipe closed at one end, open at the other, and the air column of which has a natural period of vibration equal to that of the tuning fork—that is, its length is equal to one-fourth of the wave length of the note given by the fork. If now the sounding fork is held near the open end of the pipe, the column of air in the pipe, being a natural resonator to the fork, will be set in vibration.

If the open end of the pipe is fairly large, the vibrations of the column of air will set the external air in motion more powerfully than the fork did by itself, and the intensity of the sound will be much increased. The vibration of such columns of air in pipes is made use of in many musical instruments. The sounding board of a piano or the body of a violin are also examples of resonators, increasing the natural volume of sound. Electric resonance occurs when an electrical circuit has a natural period equal or nearly equal to the period of the source of impulses or alternating electromotive force. The same kind of effect can be noted in the vibrations of a string. See Sound; Wireless Telegraphy.

Resorcin. $C_6H_6O_2$. White crystalline substance obtained by the interaction of fused sodium hydroxide and sodium metabenzene-disulphonate, or it may be obtained by fusing certain resins with caustic potash, or by distillation of Brazil wood extract. Resorcin appears as colourless crystals soluble in water and alcohol. With the aldehydes it forms formaldehyde. From it are prepared a number of dyes. It is used in medicine occasionally in certain skin affections, either as a lotion or with four parts of glycerine.

Respiration. Process by which oxygen is conveyed to the blood, and carbon dioxide and water vapour, the waste products of the tissues, are removed. In marine animals this process is effected by

means of gills. In land animals the exchange is performed through the lungs. In man the organs through which respiration is effected are the air passages, composed of the larynx, trachea, and bronchi, and the lungs, the structure of each of which is described under its appropriate heading. The movements of the thorax are caused by certain muscles which, by contracting, bring about an increase in the volume of the chest cavity. The lungs expand with this increase of volume, and air is drawn into them through the air passages. This is the process of inspiration and is a muscular act. The respiratory muscles now relax, and the elastic recoil of the chest and lungs expels the air. This is expiration, and in ordinary quiet breathing entails no muscular effort.



Respiration. Diagram illustrating the movements of the diaphragm during respiration

The ordinary muscles of respiration are: (1) the diaphragm, which is dome-shaped and forms the floor of the thoracic cavity. On contraction the diaphragm is drawn downwards, and the vertical diameter of the chest is increased. (2) The intercostals, or muscles between the ribs. The upper ribs being fixed by the muscles of the neck, the contraction of the intercostals raises the lower ribs and thus enlarges the lateral and antero-posterior diameters of the thorax.

In extraordinary or forced inspiration, such as occurs when there is obstruction to the entry of the air, or in coughing, additional muscles come into play, particularly the sterno-mastoid, serratus magnus, pectoral, and trapezius muscles. In forced expiration the abdominal muscles also contract and, by pressing on the viscera, push up the diaphragm and thus help to expel the air from the lungs. In men, the respiratory movements are most marked in the lower part of the chest and the abdomen (inferior costal type). In women, the movements in the upper part of the chest are more marked, and those of the lower part of the chest less obvious (superior costal type). The lungs are not completely emptied at the end of each expiration.

The following terms are used for the quantity of air breathed or in the lungs: Tidal air is the amount which is ordinarily breathed in and out, and in a healthy adult man is about 30 cubic ins. Complementary air is the amount in addition to the tidal air which can be drawn into the lungs by the deepest forced inspiration, and is on the average 100 cubic ins. Reserve or supplemental air is the amount over and above the tidal air which can be expelled by deep forcible expiration, and is about 100 cubic ins. Residual air is the amount which still remains in the lungs after the most violent expiratory efforts, and amounts usually to about 100 cubic ins.

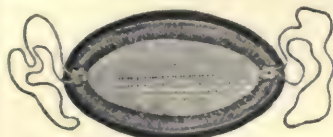
The effect of continuous muscular effort, as in running a race, is to increase largely the amount of air inhaled and exhaled at each respiration, and the establishment of this process is popularly known as "getting the second wind." The rate of respiration in a healthy adult is from 14 to 17 per minute. It is increased by exercise, febrile conditions, and certain diseases of the lungs. The total quantity of air inhaled and exhaled during 24 hours by a healthy adult varies from 400,000 to 650,000 cubic ins. The regulation of the rhythmic movements of respiration are controlled by a respiratory centre in brain, the vagus nerves, and the chemical condition of the blood.

Cheyne-Stokes respiration is a condition in which the breathing gradually becomes deeper for a brief period, and then shallower until it almost ceases, alternately waxing and waning in a rhythmical manner. It is seen in certain affections of the nerve centres.

Artificial respiration is the performance of certain movements by another person to maintain the respiratory interchange in a person in whom natural breathing has temporarily ceased. It is necessary occasionally in cases of severe shock, as from haemorrhage or surgical operations, poisoning by narcotic substances such as opium, inhalation of non-respirable gases, and drowning. Various methods are employed, the object in each case being to imitate as far as possible the natural movements of the chest in respiration. A description of the process which should be adopted in cases of apparent drowning is given under the heading drowning. See Lung.

Respirator. Instrument worn over the mouth and nose to protect the wearer from obnoxious particles in the air, from cold, etc. Respirators are often worn by firemen as a protection against smoke,

by miners and the like engaged in rescue work in disasters, in certain trades for protecting the workmen from breathing air filled with metallic or other particles, etc. Essentially it consists of a fine gauze through which the air must pass before being inhaled. Many



Respirator of wire gauze for protecting the mouth

varieties of respirator have been used, in some of which the air passes through several layers of gauze for purification and also for warming purposes. During the Great War respirators were largely used for warding off gas attacks. See Gas Mask.

Respite. In English law, a delay, forbearance, or continuance of time in a legal proceeding. Thus, if an appeal at quarter sessions is not ready for hearing, the recorder or chairman may order the case to be respited until the next sessions. It has much the same meaning as the word adjourn. See Reprieve.

Respondentia. A written contract, whereby the captain of a ship borrows money for the use of the ship on an emergency arising out of a maritime risk, which risk appears from the written contract, and hypothecates (i.e. mortgages) the cargo as security for repayment of the loan. When the contract includes ship and freight, as well as cargo, it is called bottomry.

Responsibility. Condition of being responsible, a term frequently used in English law, in contracts and statutes. In leases it is frequently provided that the lease shall not be assigned except to a respectable and responsible person. The word here means a person who has the necessary means to pay the rent and satisfy the other lessees' obligations. Carriers of goods sometimes stipulate that they will not be responsible for certain articles (e.g. livestock and perishable goods) entrusted to them for carriage; and such a stipulation covers both loss and damage. A bankrupt M.P. may be certified as not responsible for his bankruptcy where it has been caused by sheer misfortune.

Rest. In music, sign to indicate silence. Rests are of different values corresponding to the various notes. They may be dotted, but never twice-dotted. Silence for a whole bar,

whatever the value, is usually shown by a semibreve rest. The word is used by the Bank of England and other banks for their reserves, while another meaning is for that part of a lathe which supports the cutting tool.

Restaurant (Fr. *restaurer*, to restore). Establishment where refreshments and meals are provided. The word was first used in this sense in Paris about 1765 by one Boulanger or Champ d'Oiseau, who opened the first establishment of the kind in the rue des Poulies. His success brought imitators. Chefs and stewards left their employers and opened restaurants, especially after the Revolution, when ruined masters could no longer keep up a staff. Among the early restaurants was that kept by Antoine Beauvilliers, the inventor of the à la carte system. Voisin's and Paillard's are well-known modern Parisian restaurants.

Of the few London restaurants where old English fare survives the most widely known is the Cheshire Cheese, in Wine Office Court, Fleet Street, famous for its pudding of many choice ingredients. Birch's, the celebrated turtle soup house in Cornhill, and Simpson's, in the Strand, are also noted.

What may be called the restaurant habit in London dates from the later decades of the 19th century. The large fashionable hotels began to cater for the needs of fastidious diners on an elaborate scale, and for many people with money to spare a restaurant dinner became the normal way of starting the evening. Suppers after the theatre became popular. Other establishments unattached to hotels competed, at widely varying prices, for the custom of Londoners anxious to escape from the comparative dullness and monotony of dining at home. The restaurants of



Rest Harrow. Leaves and flowers

Soho, run by French or Italian proprietors, provide good dinners tastefully served at reasonable prices. The popularity of the restaurant was due in part to the growing difficulty of obtaining efficient domestic servants. See Café.

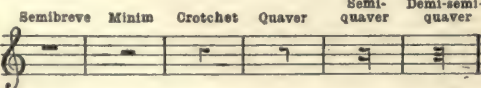
Rest Harrow (*Ononis spinosa*) or WILD LIQUORICE. Shrubby dwarf perennial of the natural order Leguminosae. It is a native of Europe, W. Asia, and N. Africa. It has a creeping rootstock, above or below ground, whose rooting gives it so firm a hold that it was said to arrest the plough or harrow in its progress. The leaves are undivided or broken up into three leaflets. The flowers, of somewhat similar form to those of the furze, are pink with red streaks. The fruit is a small pod. In dry soils the stems become more erect and develop spines.

Restigouche. River of New Brunswick, Canada. It rises in the hills in the W. of the province, flows N.E., and then turning E. forms the boundary between Quebec and New Brunswick. It is 225 m. long, falls into Chaleur Bay, and is navigable for large vessels for about 20 m. The name, an Indian one, means "the river in the shape of a hand," the reason being that it has five main arms.

Restitution (Lat. *restituere*, to set up again). Act of restoring something taken away, or making good. The restitution of conjugal rights is a phrase used in English divorce law. A husband or wife whose spouse refuses to cohabit may obtain a decree for the restitution of conjugal rights, whereby the spouse is ordered to return to cohabitation within a fixed time. If the respondent disobeys the order he or she is not punished, as was formerly the case, but disobedience constitutes desertion. See Divorce.

Restoration, THE. In English and Scottish history this term means almost always the restoration of Charles II in 1660. In France it refers to the restoration of the Bourbons in 1814. The so-called Restoration period in England embraces the years after 1660 when, in morals and literature, there was a reaction from the austerity of the Puritan rule, which showed itself in licence and even indecency. The poets and wits who led this movement are the poets and wits of the Restoration, and a group of playwrights, Congreve and Wycherley being the most prominent, are known as the Restoration dramatists.

The restoration of Charles II was the work, not of Monk, but of events. After his romantic escape



from Worcester, Charles had been an exile from England. In all three countries, however, especially in Scotland and Ireland, he had many supporters, and the harshness of Cromwell's rule added to their number. Risings, notably that of Glencairn in Scotland and Penruddocke in England, broke out in his favour, while Montrose fought brilliantly for him. But as long as Cromwell's military genius and the trained valour of his Ironsides were available, all hope of a Restoration seemed vain.

With Cromwell's death the position was wholly changed. His son Richard proved a weakling, and soon retired into private life. In 1659 the royalists arranged a rising, and, to take advantage of its desired success, Charles moved from Brussels to Calais. But the effort was a failure; concerted action was wholly lacking, and only in Cheshire was the movement at all serious. The king's friends were not successful until early in 1660, when Monk (*see* Albemarle) had been some weeks in London, and plans for a stable government had failed. By Sir John Grenville, Monk sent a verbal message to Charles, advising him to promise oblivion for past offences and religious toleration; also to move to Breda (*q.v.*), and there await events.

The declaration of Breda, drawn up on these lines, followed, and a Convention Parliament met. To this Charles sent a letter which was read on May 1. The members professed their loyalty to their king, as they now called him, and declared that their lawful and ancient government was by king, lords, and commons. On May 8, Charles was proclaimed king in London; on the 16th he received at The Hague a deputation of lords and commons, asking him to return, and on the 23rd he went on board the *Naseby*, the flagship of the fleet sent for him. Amid great rejoicing, he landed at Dover, held a council at Canterbury, and on the 29th, his birthday, he travelled from Rochester to London, where the people welcomed him with wild excitement. Scotland followed the example of England, and a parliament in Edinburgh restored the monarchy. Ireland was bound by the act of the English parliament. *See* Charles II; England: History.

Restoration. In architecture, the process of repairing or reconstructing a building, so that it shall retain or regain its original character. Restoration is almost wholly a modern art; prior to the 19th century a building that had become seriously dilapidated was either patched up in accordance

with the utilitarian needs and fashion of the day, or replaced by another of a totally different kind. The educational or aesthetic value of a medieval or Renaissance structure was never considered. In the 18th century, when the decadence of the Renaissance style had reached its limit, a mild interest was awakened in the earlier forms of building, and in Great Britain the dilettante headed a kind of Gothic revival. Wars, however, and the industrial revolution deferred the question of restoration till early in the 19th century.

A movement for the better understanding of the principles of medieval architecture was then set on foot by the Camden Society, while in 1840 the newly-formed Ecclesiological Society turned its attention to explaining the usages of the pre-Reformation Church in the light of Gothic fittings and ornaments. Meanwhile Augustus Welby Pugin (*q.v.*) had started his crusade for the resuscitation of Gothic; and restorations along this line proceeded with a rather too feverish haste. They passed finally under the control of a small band of Gothic purists who, not content to restore a church as it had been before, pulled down or mutilated those parts which did not accord with the period in which the remaining parts were built. The British Society for the Protection of Ancient Buildings, formed under Morris's influence in 1877, has since done much to improve the character of restorations, while in France the Commission des Monuments Historiques has performed invaluable service in the same direction. *See* Picture.

Restorationists. Term applied in Church history to those followers of Origen who held that all sinners will ultimately be forgiven and received into God's favour after a period of purgation in the next world. This is distinct from the R.C. doctrine of purgatory. The name has been used also for an American sect of Universalists, founded about 1818 by Hosea Ballou at Boston. He taught that sin is entirely connected with the body, and that the article of death, by freeing the soul from the body, sets it free also from the consequences of sin. His followers separated from the Universalists and formed a definite sect in 1831.

Restraint (Lat. *restringere*, to draw back). Literally, the act of hindering or limiting. Restraint of marriage is a restriction attached to a bequest forbidding a devisee to marry. The law of England, we are told by ancient writers, looks on marriage with favour—no doubt

as much for political as for moral reasons. A married man is more likely to be a good citizen than a single one. Therefore gifts given upon conditions restraining marriage will generally be held to be given as if such conditions had not been made. Thus, a devise of an estate to A, but if A marries then he is to lose the estate, is bad. It can, however, be done another way. If the gift is "I devise Blackacre to A; but upon A's marriage or death then Blackacre is to go to B" is quite good. So it is quite lawful to bequeath an income to a woman during her widowhood; but in a gift of the same income to a widow, with a condition that she shall lose it if she marries again, the condition is bad, as being in restraint of marriage.

By the law of England an agreement in undue restraint of trade is bad, as being against public policy. By such an agreement is meant one whereby a person binds himself not to exercise his trade, profession, or calling in such a way as to fetter himself unduly. And the reason why such an agreement is void is because it is to the public interest that all men shall be free to work and carry on business.

Agreements of this kind are, in the main, of three kinds: (1) When an employee, as part of his agreement of service, contracts that after his service is terminated he will not carry on the same kind of business or enter the service of another employer in the same business within a certain area. (2) When a man sells a business and agrees that he will not carry on a competing business, generally within a certain area. In both these cases the agreement is void if it is unreasonable; and it is unreasonable if it is more than is reasonably necessary to protect the promisee. This depends on the kind of business. Thus, a grocer's assistant who agreed not to take a similar situation within 20 miles of his master's shop has probably contracted unreasonably. But a doctor who has sold his practice with a covenant not to practise within 20 miles has contracted reasonably. (3) Trade union agreements whereby men agree to strike work on being called out by the union are wholly bad; and so are agreements by employers to "look out" their workmen in concert.

Restrepo, José MANUEL (1782–1863). Colombian politician and historian. Having joined in the movement for independence from Spain, Restrepo became a member of congress, and secretary to the liberator, Bolívar. He wrote a history of the Revolution.

Resultant Tones. Acoustical phenomenon produced by the simultaneous sounding and sustaining of two loud notes. Differential tones are according to the difference of vibrations between the generators. Thus, in the case of a fifth, the relative proportions of which are 2:3, the differential tone will be equal to 1, i.e. an octave deeper than the lower generator. It is on this principle that the acoustical bass of some organ pedal stops is produced. Summational tones, on the other hand, are the result of the sum of the vibrations. Resultant tones, which are more subjective than objective, were first noticed by the violinist Tartini in 1714, who taught his pupils to apply them as a test of accurate tuning. He called them *Terzi Suoni* or Third Sounds.

Resurrection (Lat. *resurgere*, to rise again). Term specially used of rising from the dead, also applied figuratively to the revival of anything in a state of decay. Every spring witnesses a resurrection, the renewal of the life of nature, to which winter had brought death. In many religions there are myths of resurrection, the descent of a god or goddess to the realms of darkness, and the ascent again to the world of light.

The conception meets us in the O.T., first of all, in the two records of restoration of life by a prophet (1 Kings xvii, 20-24; 2 Kings iv, 32-37). It is applied figuratively to the nation's restoration from Divine judgement to Divine favour (Hosea vi, 1-3). To the hope of national restoration there attached itself the hope of individual restoration from death to life. It seemed an intolerable thought that those who died before "the day of the Lord" should have no share in its blessings, and so the belief arose that the good and godly would be raised up even from the grave (Isaiah xxvi, 19). This belief was afterwards extended to include the bad as well as the righteous (Daniel xii, 2); the one class to be consigned to eternal torture, the other to be blessed with eternal life.

Doctrine of the Last Things

There can be little doubt that Judaism was strongly influenced by the corresponding doctrine of Zoroastrianism, in which there is a very detailed eschatology or doctrine of the last things. In the Apocryphal and Apocalyptic writings the doctrine of the Resurrection assumes a much more definite form. In some of these writings only the resurrection of the righteous is taught, in others of the wicked as well. In 2 Maccabees vii, 11, the martyr expects to

receive back the tongue and hands of which he had been deprived on earth. In Enoch v, 16, a contrast between present and future conditions is asserted; the garments of life given at the Resurrection will not grow old.

The Sadducees regarded this development as an illegitimate innovation, but the Pharisees accepted it (Acts xxiii, 8). How completely the latter expected the restoration of earthly conditions at the Resurrection is seen in the problem regarding the woman with seven husbands which the former submitted to Jesus for solution (Matt. xxii, 23-33). Jesus in His answer censured the Sadducees' rejection of the belief in the future life in communion with God; but no less did He condemn the Pharisaic literalism, and asserted a great change in the conditions of the future life. Paul no less insists on a continuity of life, but also on a contrast of its conditions, opposing to the natural the spiritual body (1 Cor. xv, 39-58).

The hope of the Resurrection is not, however, the survival of the soul after its escape from imprisonment in the body. In the Christian doctrine no material identity is affirmed between the body laid in the grave and the body raised, as has sometimes been assumed; that assumption is excluded by the teaching of Jesus and Paul. But what is unequivocally asserted is that the personality of which the identity is maintained will not be disembodied, but possess an organ of activity and communication, described as spiritual because adapted to spiritual uses as the natural body is not.

Second Advent

In the N.T. the Resurrection is closely connected with the Second Advent of Christ, and is expected in the immediate future. When some believers died before that much desired and eagerly expected event, Paul found it necessary to comfort the mourners with the assurance that the living at the Second Advent would have no advantage over the dead (1 Thessalonians iv, 13-18). In view of the predominance of the expectation of a speedy Advent, the N.T. is silent regarding the conditions of the intermediate state between death and the Resurrection. In the Fourth Gospel the ideas of judgement and resurrection are spiritualised, and yet the common Apostolic expectation is not abandoned. The teaching of Jesus, according to the Fourth Gospel, about the Father's house of many mansions (xiv, 1-3), has led modern Christian faith to assume,

without recognizing any departure from the prevalent teaching of the N.T., that Christ receives the believer at death, and that the glory and blessedness of heaven are at once possessed.

The divine seal on the human hope of resurrection is given in the fact of the Resurrection of Jesus (1 Cor. xv, 12-19). To conceive this fact as merely a survival of the soul of Christ is to ignore the consistent meaning of the word resurrection in the Old and the New Testament. To add the epithet spiritual does not justify such a wide departure from the usage. The N.T. teaches that Jesus was raised from the dead bodily. It is not at all necessary to assume any material identity of the body laid in the sepulchre with the body in which Christ appeared. It was with a spiritual body Jesus rose from the dead, and the relation between that and His natural body we may assume is described by Paul (1 Cor. xv, 51-52); by an act of God the one was changed into the other.

Gospel Evidence

On the belief in the Resurrection the faith of the Christian Church in Christ as Living and Reigning Saviour and Lord rests. The attempt to account for that belief apart from the fact, as in the vision hypothesis, has against it the amount and the nature of the evidence, the number and the character of the witnesses, in all of whom the necessary psychical conditions of vision cannot be assumed as present. The records in the Gospels of the appearances, while not contradictory, cannot be entirely harmonised; but they are not the oldest literary evidence. That is found in 1 Cor. xv, 1-11, written at a date so near the event itself as to preclude the growth of a myth, while Paul's conversion is the most striking proof of the presence and operation of the Risen Lord. See Incarnation; Jesus Christ.

Alfred E. Garvie

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Resurrection Bay. Inlet of Alaska, on the S.E. coast of Kenai peninsula. From the bay was launched in 1794 the first vessel built in Alaska (q.v.).

Resurrection Men.

Term used for the men who made a practice of disinterring dead bodies, usually those just buried. They did this in order to sell them to medical students and others for dissecting purposes. In England the practice was very prevalent between about 1760 and 1840. They were known as body snatchers. See *Body Snatching*; *Burke and Hare*.



Édouard de Reszke, as Mephistopheles

Resuscitation (Lat. *resuscitare*, to raise again). Revival of the apparently dead. Such are those who are apparently lifeless from the effects of shock, e.g. electrical, suffocation, asphyxiation, syncope, etc.

The commonest form of apparent lifelessness is that due to syncope or fainting. In such cases the feet should be raised and the head lowered. The recumbent position in all cases requiring resuscitation, indeed, is one of the first things which should be obtained. This should be followed by the loosening of any tight articles of clothing, e.g. collar, corsets, etc., which may impede respiration, and plenty of air should be allowed to reach the patient. In serious cases the heart action may be stimulated and respiration increased by sprinkling the face with water, or by the application of spirits of camphor or weak ammonia or smelling salts to the nostrils, and by giving a small dose of brandy or other spirit. In extreme cases artificial respiration (*q.v.*) and stronger restoratives must be resorted to in order to restore the sufferer.

Those suffering from electric shock should be revived by artificial respiration, and heat should be applied to the limbs. Brandy, strychnine, and other stimulants should be administered. In cases of poisoning from coal gas and carbonic dioxide, artificial respiration should be tried, and oxygen administered when possible.

Resuscitation of newly born babies cannot be attempted by the ordinary methods of artificial respiration. The baby must have air first of all introduced into its lungs, the best way being by direct

insufflation from the mouth of the nurse, or other person present. See *Drowning*; *First Aid*.

Reszke, ÉDOUARD DE (1855-1917). Polish singer. Brother of Jean de Reszke, he was born in Warsaw, Dec. 23, 1855, studied singing at Milan and Naples, and became a leading bass at the Théâtre Italien, Paris, 1876, later joining the Opéra there. His bass voice had fine quality and training, and he acquired dramatic abilities. Along with his brother he appeared regularly at Covent Garden from 1888-1900, and his Wagnerian parts and his Mephistopheles were among his chief successes. He taught singing in London, 1907, and later in Warsaw and Paris, and died on May 29, 1917.

Reszke, JEAN DE (1850-1925). Polish singer. Born at Warsaw, Jan. 14, 1850, he was educated at Warsaw University, and studied singing in Italy. He appeared as a baritone in opera in Venice, 1874, London, 1875, and Paris, 1876. Turning tenor, he made a sensation by his performance in Madrid, 1879, and in Paris, 1883, in *Hérodiade*, and *Le Cid* of Massenet, and from 1888-1900 performed regularly at Covent Garden. His tenor voice was singularly pure and well controlled, and his Wagnerian performances were specially memorable. He played in the Paris Opéra before retiring through ill-health, 1904. He died April 3, 1925.

Retainer. Fee of a nominal amount paid to a barrister in order to retain his services either generally, or for a particular case. A barrister so retained has a right to be briefed at a fee proportioned to his rank and standing at the bar, and once he has accepted a retainer he cannot accept a brief for the other side, no matter how tempting a fee they may offer him. A brief fee, which is of substantial amount, is frequently, though wrongly, described as a retainer. See *Barrister*; *Brief*.

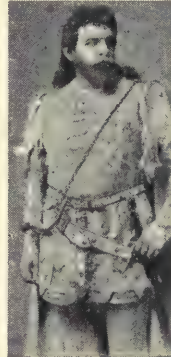
Retaining Wall. Strongly built wall of masonry, brickwork, concrete, or reinforced concrete, intended to hold up earth around an excavation or cutting, or along a sea front, or the banks of a river or canal. In engineering practice, retaining walls are often of large dimensions, as in railway and dock construction. In building construction, retaining walls are chiefly required for holding up the earth around cellars and basements.

The form of cross section adopted for retaining walls varies considerably according to circumstances. Some of the forms most frequently used for solid walls are shown in Figs. 1 to 4. Fig. 1 represents a rectangular section, which is only suitable for very low walls owing to the wasteful employment of material. Figs. 2 and 3 are more economical sections, one having a vertical face and the back constructed in offsets, and the other having a sloping or battered face with a vertical back. Fig. 4 shows a wall with sloping face and offset back, the footings being inclined with the object of increasing resistance to forward sliding.

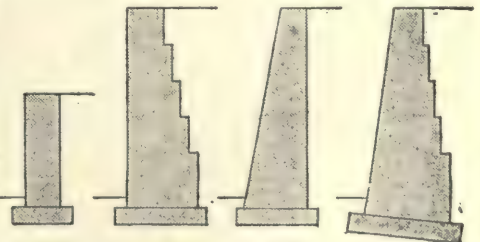
A retaining wall may fail (1) by sliding on the plane of any horizontal joint; (2) by overturning about the front edge of any horizontal joint; (3) by crushing at the front edge of any horizontal section. For the scientific design of a retaining wall, it is necessary to know the amount of earth pressure, its point of application, and its line of action.

A simple rule given by Sir Benjamin Baker provides that the width of the base for average ground shall be one-third of the height from the footings to the top of the wall, that a thickness of one-fourth of the height with a batter of 1 or 2 ins. per foot on the face is sufficient with favourable backing and foundation, and that under no ordinary conditions of surcharge or heavy backing is it necessary to make a retaining wall on a solid foundation more than one-half of its height in thickness.

The foregoing rule is not suitable for reinforced concrete retaining



Jean de Reszke, as Lohengrin



Retaining Wall. Examples of various types. See text

walls, which require only a small fraction of the amount of material required for a solid masonry or plain concrete wall. *See Building.*

Retention. In Scots law, a term used for the right of a creditor to retain the property of a debtor, who has not paid his debt to him, until such is paid. The right is limited to the special purposes and conditions of the deposit.

Retford, EAST. Mun. borough and market town of Nottinghamshire, England. It stands on the



East Retford. Seal of borough council

Idle, 138 m. from London and 18 m. from Newark, and is served by the G.N. and G.C. Rlys., also by a canal. The chief church is S. Swithin's, rebuilt in the 17th century, and the chief buildings are the town hall, corn exchange, and grammar school, founded in 1552. The industries include corn mills, iron foundries, rubber works, and paper mills. There is a large agricultural trade, for which there is a commodious covered market. In the Middle Ages East Retford became a borough, and held fairs and markets. It was separately represented in Parliament from 1571 to 1885. In 1830 the hundred of Bassetlaw was made part of the constituency. West Retford is a part of the borough. Market day, Sat. Pop. 13,400.

Rethel. Town of France. In the dept. of Ardennes, it stands on the Aisne and the canal des Ardennes, 23 m. from Reims. The chief buildings are the church of S. Nicholas and the Hôtel Dieu. A Roman settlement, Rethel was an important place in the Middle Ages, when a priory was founded here. It was the capital of a county, at one time part of Burgundy. This was made a duchy in 1581. There was a good deal of fighting around Rethel during the Great War. Pop. 5,700. *See Aisne, Battles of the.*

Reticulum (Lat., little net). In astronomy, a southern circumpolar constellation, one of the four which border on the Greater Magellanic Cloud between Hydrus and Dorado. It was so named by Lacaille. *See Constellation.*

Retimo or RETHYMNON. Port and town of Crete, the ancient Rethymnos. On the N. coast, about 49 m. W. of Candia, it has a shipping trade in olive oil and valonia. Pop. about 10,000. *See Crete.*

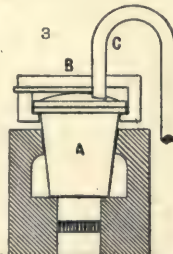
Retina. Membrane composed of ten layers of tissue. It forms the innermost covering of the interior



of the eyeball, extending forwards to within a short distance of the margin of the pupil. It is formed by an expansion of the optic nerve. The retina is the structure upon which fall images formed by rays of light passing through the lens, and it transmits through its complex layers the stimulus caused by the image, thus giving rise to the sensation of vision. *See Eye.*

Retinitis. Disease of the eye. It takes the form of inflammation of the retina. *See Eye.*

Retort (Lat. *retortus*, bent back, twisted). Generally, an apparatus in which a mixture or compound is broken up by the aid of heat or chemical action. One or more of the constituents of the contents of the retort is volatilised and expelled from the apparatus into another appliance where it



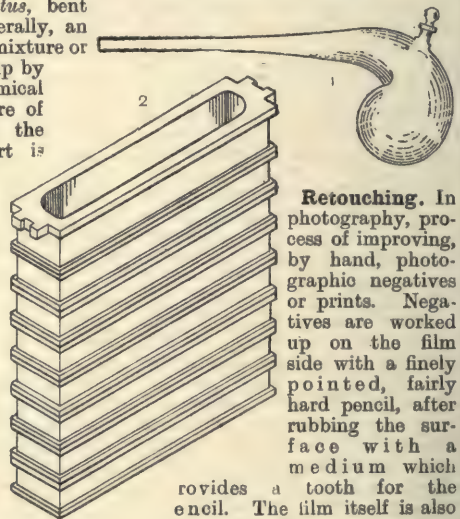
Retort. 1. Glass laboratory retort. 2. Built up fireclay retort. 3. Iron retort for distilling quicksilver from gold amalgam: A. Retort. B. Cramp to secure cover. C. Vapour pipe to convey quicksilver vapour

may be condensed or absorbed and so collected. There are three broad classes: first, the well-known appliance of the chemical laboratory made usually of glass, but sometimes of earthenware, clay, or metal; secondly, the fireclay or iron chamber of the ordinary gas works in which coal is destructively distilled, and from which the crude gas issues to the hydraulic main; and thirdly, the vessels, which are of various shapes and materials, used by the metallurgist for the extraction of certain metals from their ores and for the separation



Retford, Nottingham. Parish church of S. Swithin; top, left, Town Hall, built in 1868

of the metals of amalgams. The term is also sometimes applied to the containers or muffles in which iron is converted into steel by contact with carbon. A still is a retort. *See Appolt Oven; Charcoal; Distillation; Mercury; Zinc.*



Retouching. In photography, process of improving, by hand, photographic negatives or prints. Negatives are worked up on the film side with a finely pointed, fairly hard pencil, after rubbing the surface with a medium which

provides a tooth for the pencil. The film itself is also shaved down where required with a sharp knife, and the opacity of the negative increased or reduced by these two means. Negatives are also worked up on the glass side with pencil or

powder (applied with a stump) on a coating of matt or other varnish. Prints are worked up with chalks, with water colours, and very largely with an air-brush or atomiser by which a fine spray of colour is applied. See Photography.

Retouching. Term for the work of correcting the tone values of an illustration in order to prepare it for printing. It consists in the elimination and eradication of useless and confusing detail, and generally in strengthening or reducing the tones in a photograph for the purposes of process reproduction in a book, magazine, or newspaper. In ordinary photography, yellow and red objects reproduce to dark blue or light. The materials used are water colours. See Screen.

Retreat (Lat. *retrahere*, to draw back). Retirement or drawing back. It is chiefly used in a military sense for a withdrawal from before the enemy. It may be done to secure a better position for fighting, and implies a certain amount of order and cohesion, otherwise it becomes a rout. Notable retreats are those of the Ten Thousand described by Xenophon, Sir John Moore's retreat from Corunna, Napoleon's retreat from Moscow, and the retreat from Mons. Retreat is the word used for the bugle call sounded at sunset in camps and barracks. It is a reminder that pickets must assemble for duty and guards adopt the precautions usual at night time. See Anabasis; Rearguard.

Retreat. Place of retirement for religious exercises and meditation. The word is applied to a monastery, convent, or hermitage, e.g. S. Joseph's Retreat, Highgate, London, mother house in England of the Passionists (*q.v.*).

Retriever. Sporting dog of the spaniel group, produced by a cross between the lesser black Newfoundland and the water spaniel. It is employed for retrieving game on land as the water spaniel does in water. In many cases a strain of setter blood has been introduced.

There are three types of retriever recognized by sportsmen. The Labrador is, as a rule, merely a small black breed of Newfoundland; the flat or wavy-coated is the result of a cross between the Labrador and setter and collie; and the curly-coated is a cross with a considerable strain

of poodle in him, and is equally good in water or on land. A retriever should have what is known as a tender mouth, and should hold the game without mangling it. Some of these dogs will carry a bird so gently as not even to displace its feathers. Retrievers are, as a rule, black in colour, but liver-coloured and black-and-tan specimens are not uncommon. See Dog, colour plate.

Retrograde (Lat. *retro*, back; *gradi*, to walk). In astronomy, term applied to the motion of a planet or the satellite of a planet when it is in the direction opposite to the general direction of motion. Thus, Oberon and Titania, the two moons of Uranus, were found by Herschel to revolve about their planet in a direction contrary to that of all other members of the solar system. Since then Phoebe, the ninth satellite of Saturn, and the moon of Neptune have been found to have a similar retrograde motion. The term is also applied to the apparent movements of planets in the skies as seen from the earth. Many comets also have a retrograde motion.

Retrogression. In music, a contrapuntal device by which the theme or subject is repeated by being played backwards. It is also known as retrograde imitation. See Counterpoint.

Returning Officer. Official who conducts an election. In parliamentary elections the duties are performed by the sheriff in counties, and in boroughs by the mayor. Certain expenses incurred are allowed by statute. On the issue of the writ the returning officer receives nominations for the vacant seat, and also the cautionary deposit of £150 from each candidate, except in the case of university elections. It is also his duty, sometimes by deputy, to see that the election is held in the manner prescribed by law. He announces the result and reports it in proper form to the Speaker. See Election.



Retriever. Flat-coated retriever, a British sporting dog.

Retz, JEAN FRANÇOIS PAUL DE GONDI, CARDINAL DE (1613-79). French ecclesiastic and writer.

Born at Montmirail, Sept. 20, 1613, he was educated for the Church, and was made co-adjutor to his uncle the archbishop of Paris, 1643, succeeding him in 1654.



Cardinal de Retz
French writer

He was a prominent enemy of Mazarin before and during the Fronde (*q.v.*), but became a cardinal despite Mazarin's opposition. Imprisoned in 1652, he escaped in 1654, and lived abroad until the death of Mazarin, becoming abbot of St. Denis, 1662. He retired to St. Mihiel, and died in Paris, Aug. 24, 1679. His *Memoirs*, published 1717, Eng. trans. 1904, give a brilliant picture of his times. See Works, 1870-96. *Prom. Race.*

Retz, RAIS OR RAIZ, GILLES DE (c. 1396-1440). French soldier and criminal. Born of the Laval



Gilles de Retz,
French soldier

family, he served in the wars, and was made marshal of France. Later he was tried on a charge of disobedience to the authority of John VI of Brittany, and

the discovery was made that he had engaged in an almost incredible series of murders and debauches. Human remains were found at Vannes, Chantocé, Machecoul, Nantes, Rais, Tiffange, etc., and it was estimated that some 150 children and numerous women had met death at his hands. He was hanged and burnt at Nantes, Oct. 25, 1440. Perrault's story of Bluebeard is supposed to be founded on his career. See Bluebeard, Account of G. de R., E. A. Vizetelly, 1902.

Reuchlin, JOHANN (1455-1522). German scholar. Born at Pforzheim, Baden, Feb. 22, 1455, a cousin of Melancthon, he visited most of the seats of learning in Europe, studied Greek, Latin, and Hebrew, taught jurisprudence and literature, was private secretary to the court of Lorenzo de' Medici at Florence, a



Johann Reuchlin,
German scholar

judge of the Swabian League, and held professorships at Wittenberg, Ingolstadt, and Tübingen. His *Rudimenta Linguae Hebraicae*, 1506, gave a remarkable impetus to the study of the Hebrew text of the Bible. When the destruction of Jewish books except the O.T. was proposed, he aroused controversy by maintaining that only those of pronounced anti-Christian character should be condemned. He published a Greek grammar and a Latin lexicon, edited Greek texts, and wrote *De Verbo Mirifico*, 1494; and *De Arte Cabbalistica*, 1517. He died at Liebenzell, Bavaria, June 30, 1522. *See* Renaissance; consult also *Life and Times of R.*, F. Barham, 1843. *Pron.* Roikhlín.

Reunion. Name applied to the union of the various Christian churches. The movement for reunion took shape and strength during the 19th century, and in the 20th several unions took place. In England three of the Methodist bodies, in 1907, united to form the United Methodist Church, and the Free Church and the United Presbyterian Church united in Scotland in 1900 to form the United Free Church of Scotland (*q.v.*).

In Scotland, Presbyterians are working for further reunion, first among themselves and also with the other religious bodies. A step forward was the carrying of the second reading of the Church of Scotland bill in Parliament in 1921, to facilitate the union between the two great branches of Presbyterianism, the Church of Scotland, and the U.F. Church. In England proposals are before the Free Churches, already federated, to unite with the Church of England, and meetings of representatives of both sides have taken place; also for a reunion of all the Methodist churches. In the U.S.A. and Canada reunion has made great advances. *See* Lambeth Conference.

Réunion, ÎLE DE LA. Island of the Indian Ocean, a French colonial possession. It lies about 400 m. E. of Madagascar, and, measuring some 45 m. in length and 32 m. broad, has a total area of 970 sq. m. The surface is mountainous, and the island, of volcanic origin, is crowned by the extinct volcano, the Piton des Neiges, 10,070 ft. It is well watered, and has a fairly healthy climate. Sugar planting is the chief agricultural activity, other products including coffee, tea, tobacco, rubber, cloves, rice, tapioca, and maize. Rum is manufactured in large quantities. A rly., built 1887, serves the chief centres.

The capital is St. Denis (pop. 24,000), other towns being St. Pierre (29,000), St. Paul (19,000),

St. Louis (13,000), and St. Benoit (11,000). The island is administered by the colonial governor, assisted by a private council, and there is a general council of 36 members, elected by universal suffrage, which formulates the local budget, etc. In Paris Réunion is represented by one senator and two deputies. Its mixed pop. totals 175,000, which includes 130,000 French.

Discovered by the Portuguese Pedro de Mascarenhas, 1513, it was taken over by a French explorer in 1638, and was known as Bourbon from 1649. From 1810–15 it was in English hands, and was renamed Réunion when restored to France.

Reus. City of Spain, in the prov. of Tarragona. It is 10 m. by rly. W. of Tarragona, and 4 m. N. of Salou, its port on the Mediterranean. It has an art academy, and handsome public buildings. The prosperity of the town dates from 1750, when an English colony here founded a trade in cottons, leather, wine, etc. It manufactures also hats, silk, soap, and linen, and exports flour, fruit, and brandy. Pop. 25,000.

Reuss. River of Central Switzerland, a tributary of the Aar. It rises on the N. slope of Mt. St. Gotthard, in canton Uri, and flowing past Andermatt and Amsteg, enters the lake of Lucerne near Flüelen. Leaving it by the town of Lucerne, it flows through Aargau to unite with the Aar near Windisch after a course of about 90 m. *See* Aar; Rhine.

Reuss. District of Germany, part of the republic of Thuringia. In the Middle Ages this tract of land in the centre of Germany came under the rule of a line of counts who were vassals of the emperor. One of them was, for one reason or other, known as der Russe, or the Russian, and this became the name of his county, which, in 1564, was divided into three parts. The branch ruling one quickly died out, but the other little states remained until the changes of 1918. Their rulers obtained the title of prince in 1778 and 1806 respectively, and were known as the princes of Reuss-Greiz and Reuss-Schleiz-Gera.

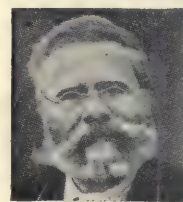
In 1918 the principality of Reuss-Greiz had an area of 122 sq. m., and that of Reuss-Schleiz-Gera one of 319 sq. m. The total pop. was 212,000. The chief rivers therein are the Saale and the White Elster, and the district is mainly an agricultural one. Greiz and Gera were the capitals and each had a constitution, including a tiny legislature. The reigning families had the curious custom of

naming each male member Henry, distinguishing them by numbers. In 1871 both states joined the German Empire, and they sent one member each to its Bundesrat and one each to its Reichstag. In April, 1919, the two, being then republics, were united into one, and in Dec., 1919, they joined with other states in forming the republic of Thuringia (*q.v.*).

Reutel. Village and ridge of Belgium. It is in the prov. of W. Flanders, 1½ m. E. of Polygon Wood (*q.v.*). Captured by the British in 1917, they were lost in the German advance of April, 1918, and finally recovered by the Allies in the autumn of that year. *See* Ypres, Battles of.

Reuter, GABRIELE (b. 1859). German novelist. Born Feb. 8, 1859, at Alexandria, Egypt, where her father was in business, she returned to Germany on his death, 1872, and eventually settled in Berlin. She had been writing fairly successful novels, 1876–94, when she produced a remarkable study of the feminine mind in *Aus guter Familie*, 1895. This achieved considerable success, and was followed by others. *Pron.* Roiter.

Reuter, HEINRICH LUDWIG CHRISTIAN FRIEDRICH, OR FRITZ (1810–74). German humorist. He



Fritz Reuter,
German humorist

was born at Stavenhagen, Mecklenburg-Schwerin, Nov. 7, 1810. As a law student at Jena, he became involved in political agitations in 1833, and was sentenced to death, but the sentence was commuted to 30 years' imprisonment. Freed at the amnesty of 1840, he subsequently led a varied life as farmer, teacher, and journalist.

In 1853 he published *Läuschen un Rimels*, a volume of verses and anecdotes in Low German. This work attained immediate popularity and was succeeded by other sketches and stories of mingled humour and pathos, which gained for him the title of the German Charles Dickens, and the position of one of Germany's leading literary humorists. His other works included *Olle Kamellen* (Old Time Stories), 1860–66. In this series were *Ut Mine Festungstid* (From my Prison Life), 1862; and *Ut Mine Stromtid* (From my Life as Farm Steward), 1864; this, one of his finest books, was translated into English, 1878. He died at Eisenach, July 12, 1874.

Reuter, ADMIRAL VON. German sailor. He was appointed commander-in-chief of the German naval force which, under the terms of the Armistice, had to be surrendered to the Allies. On Nov. 21, 1918, flying his flag in the battleship Friedrich der



Admiral von Reuter, German sailor

Grosse, he delivered up the German fleet to Admiral Beatty, and later accompanied it to Scapa Flow. On June 21, 1919, Von Reuter ordered it to be scuttled. When taken into custody by the British, he stated that he believed from the German newspapers that the armistice had terminated, and he personally gave the order in pursuance of orders given early in the war that no German war vessel was to be surrendered. He returned to Germany in Jan. 1920.

Reuters, LIMITED. British news agency. Its founder, Paul Julius de Reuter, was born at Kassel, Germany, July 21, 1816. He became a bank clerk, and the world-wide organization that bears his name began in 1849 with a pigeon post instituted by him for the dispatch of commercial news between Brussels and Aix-la-Chapelle. Soon after the first cable was laid between Dover and Calais, Reuter became a naturalised British subject, set up his headquarters in London, 1851, and converted the business into a limited liability company in 1865. He was made a baron by the duke of Saxe-Coburg in 1872, and died at Nice, Feb. 25, 1899, being succeeded by his son Julius Clement Herbert (1852-1915). In 1916 the undertaking of Reuter's Telegram Co., Ltd., as it was then known, was acquired for £550,000 by the Hon. Mark Napier, Lord Glenconner, Viscount Peel, and Sir Leander Starr Jameson. The offices are at 9, Carmelite St., London, E.C. See News Agency; consult The Street of Ink, H. Simonis, 1917.

Reutlingen. Town of Württemberg, Germany. It stands in a fertile neighbourhood on the Echatz, 20 m. from Stuttgart. S. Mary's Church, a Gothic building, dating from the 13th century, was restored 1893-1901. It contains a

beautiful font and a carved group representing the Entombment. The tower, 240 ft. high, is 15th century work. There are a number of manufactures, including cotton and woollen fabrics, some tanneries, and a trade in wine and fruit. Reutlingen became a free city of the Empire soon after 1200, and remained so until made part of Württemberg in 1803. Pop. 29,000.

Reval. Capital and chief port of Esthonia, and capital of the district of Harju. It stands on the



Reval arms

Esthonian forests supplying for the last named the finest veneer and three-ply fabric in the world, nearly three-quarters of whose tea-

tributes. Among its industries are shipbuilding, distilling, cotton manufacture, pulp and paper-making, and furniture, the birch of the East by the famous Luther furniture factory here. The chief exports are potatoes, grain, paper, furniture, spirits, shale - oil, and cattle.

Rising from the shore to the Dom on high, rocky land, where



Bay of Reval, at the mouth of the Gulf of Finland, and has an excellent harbour, sheltered by islands and ice-free for nine months of the year. Connected with Russia by the Reval-Narva-Petrograd rly., and by other lines with Baltic Port, Hapsal, Pernau, Pskov, and the Latvian system, it has an extensive commerce, to which the Russian transit trade largely con-



Reval, Esthonia. Town and harbour, showing spire of the Olai-Kirche. Top, left, old market place

are the government buildings and part of the ancient fortifications, Reval presents a fine appearance from the sea, but its principal streets are narrow, steep, and badly paved, and its numerous medieval houses, though picturesque, are ill suited to modern requirements. Since Esthonia became independent, the city, as the government centre, has much increased in importance and population.

Founded by a Danish king in 1219, it entered the Hanseatic League, 1284, and passed in succession under the control of the Teutonic Knights, 1346, Sweden, 1561, and Russia, 1710. During the Great War it was occupied by the Germans in Feb., 1918, and following their withdrawal in Nov. of that year was visited by a British naval force which co-operated with the Esthonians in repulsing the Bolsheviks. A commercial directory of Reval was published in Esthonian, German, and English in 1921. Its Esthonian name is Tallinn. Pop. (1922) 125,000. See Esthonia.



Reutlingen, Germany. Garten Tor, one of the gates in the old city wall

Reveille (Fr. *réveiller*, to awaken). Term used in the army for the bugle or trumpet call which rouses men in the morning. *Pron.* revally or revelly.

Revel. Term for a noisy, riotous feast or merry-making. It was applied to the English and Scottish foolery carried on under a lord of misrule or abbot of unreason (*q.v.*). At an early date entertainments at court were known as revels, and the official whose duty it was to arrange and control these entertainments was known as the master of the revels. The office is at least as old as the time of Edward III.; by the time of Henry VIII it was a post of importance, and in Elizabeth's reign the master of the revels, *magister jocosum, revelorum et maseorum*, was made also dramatic censor. Sir Edmund Tilney held the office, 1579-1610, and his successor, Sir George Buc, wrote a treatise on the Art of Revels which has been lost. By 1737 the office seems to have died; the theatrical jurisdiction attached to it was, at all events, transferred to a legally appointed stage censor. See *The Tudor Revels*, E. K. Chambers, 1906; William Hunnis and the Revels of the Chapel Royal, C.C. Stopes, 1910; Censorship in England, F. Powell and F. Palmer, 1913.

Revelation (Lit., an unveiling). Name used to describe the self-manifestation of God to man or the disclosure by God of Divine truth to man. In every form of religion there are two sides: (1) the quest of man for God; (2) the impartation by God of truth to man. The second aspect is known as Revelation. The belief in Revelation assumes the possibility that God can communicate knowledge of Himself to man. This communication is made in many forms. It may come through nature. As the Psalmist says: "The heavens declare the glory of God, and the firmament showeth his handiwork." It may come through the enlightenment of the mind and the awakening of conscience. The Hebrew prophets felt that God had put His word into their mouths.

The older theories of inspiration maintained that the truths of Revelation were verbally dictated to the prophets. That view is now completely abandoned (*see* Prophecy). "Spiritual things are spiritually discerned." There must be a certain quality of mind and soul in the recipient before the Divine manifestation can be imparted, and the character of the Revelation is always coloured and modified by the character of the personality to whom it is given. Hence there was a development in

the process of Revelation, because there was a growth in the capacity of men to receive the Divine truth. The O.T., therefore, is the record of the development of Revelation, which continually works up toward its climax in Christianity. Christianity claims to be the perfect, complete, and final Revelation of God. *See* Bible; Inspiration.

Revelation, Book of. Book of the N.T. The title is derived from the Greek word *Apokalypsis* (unveiling, or revelation), and hence the book is often called "The Apocalypse." It belongs to a special type of literature known as Apocalyptic, and stands in the same class as the Book of Daniel and the many Jewish Apocalypses which appeared in the intermediate period between the O.T. and N.T. Tradition ascribes the authorship of the book to John the Apostle, but ever since the time of Dionysius of Alexandria this has been questioned, and most modern scholars are agreed that it could not have been written by the author of the Fourth Gospel.

The interpretation of the Apocalypse has always been a difficulty; while its strange and fantastic imagery has always appealed to the Christian mind, there has been the utmost diversity of opinion as to its meaning. Some theologians, known as the Futurists, have held that its predictions are entirely concerned with the events connected with the end of the world. Others hold that it contains a prophetic forecast of the history of the world, from its own day to the end of time.

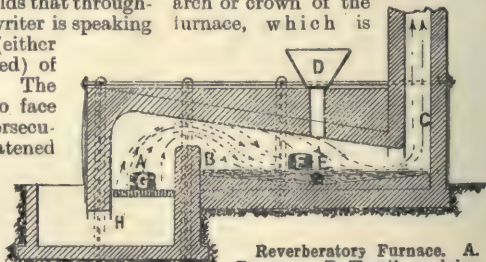
Both views are improbable, as they are in conflict with the writer's own statement that he was speaking about things which were "shortly to come to pass," and moreover they are out of keeping with the genius of ancient prophecy. It is a great mistake to suppose the Book of Revelation contains a cryptogram, by solving which it is possible for us to ascertain the date of the end of the age. The true interpretation is what is known as the Preterist, which holds that throughout the book the writer is speaking of the events (either actual or predicted) of his own day. The Church was face to face with a serious persecution which threatened its extinction. The conflict between Christianity and Caesar-worship was at its height. The book of Revelation was written to

comfort and encourage the suffering Christians in the age of Domitian. It held out to them the promise, which was the main article in the Apocalyptic faith, of the intervention of God, Who would destroy their enemies and secure their own salvation. *See* Apocalypse; Bible; John, S.; consult also *The Book of the Revelation*, C. Anderson Scott, 1905.

Reventlow, COUNT ERNST CHRISTIAN EINAR LUDWIG DETLEV ZU (b. 1869). German publicist. Born at Husum, Aug. 18, 1869, heserved in the navy, but became known as an able journalist of the Pan-German party and writer of books on strategic and political subjects. His articles in the *Deutsche Tageszeitung* on naval policy during the Great War attracted wide attention. His published works include a history of the Russo-Japanese War, 1906; *English Sea Power*, 1906; *World Peace or World War*, 1907; *The Kaiser and the Monarchists*, 1913; *Germany on the Sea*, 1914; *Germany's Foreign Policy, 1888-1913*, 1914; *The Influence of Sea Power in the Great War*, 1918; *Political Antecedents of the Great War*, 1919. *Pron.* Raven-tlo.

Revenue (Lat. *revenire*, to come back). Receipts or rents of any kind. The word is chiefly used, however, for the revenue of a state, as are the phrases, national revenue and inland revenue. A revenue officer is an officer of the customs and excise, and a revenue cutter, an armed vessel, such as was formerly used to prevent smuggling. *See* Customs; Income Tax; National Finance; Preventive Service.

Reverberatory Furnace. Type of furnace much used in metallurgy and in the manufacture of certain heavy chemicals. It is so called from the form of the internal arch or crown of the furnace, which is



Reverberatory Furnace. A. Furnace. B. Hearth or laboratory. C. Chimney. D. Hopper for introduction of ore. E. Taphole for withdrawal of molten metal. F. Side door giving access to furnace. G. Furnace door. H. Ashpit

designed so as to throw down or throw back the flame or the hot gases employed upon the material on the furnace hearth, that is to say, to make them *reverberate* from the arch or crown. Various forms are in use, but they are mostly rectangular in plan and consist essentially of two parts, the hearth or bed upon which the material to be treated is deposited, and the fire place or grate where the fuel is burned.

These two parts may be close together in the one structure, or they may be separated by a considerable distance. The grate may be dispensed with and the fuel brought to the furnace in the form of gas from a producer in a separate establishment altogether; and ignited only as it enters the reverberatory furnace. In any case it will be seen that this type of furnace is distinguished from the blast furnace and some other kinds by the fact that the fuel need not be, and generally is not, in contact or mixed with the ore on the hearth, which is one of the valuable features of the design. The puddling furnace, the Siemens' furnace, and the tube furnace all belong to this type. See Furnace; Metallurgy.

Revere, PAUL (1735-1818). American soldier. He was born in Boston, Mass., and about the age of twenty was an officer in the artillery. Later he was successively a goldsmith and a copper plate engraver. He took part in the destruction of tea in Boston Har-



bour, Dec. 16, 1773, and in April, 1775, rode out by night from Charleston to Lexington and other places, arousing the minute men to oppose the advance of the British troops on Concord. This exploit is the theme of Longfellow's poem, *Paul Revere's Ride*. During the war he rose to the rank of lieutenant-colonel. He founded the Revere Copper Co. at Canton, Mass., in 1801, and died May 10, 1818. See True Story of Paul Revere, C. F. Gettemy, 1905.

Reverend (Lat. *reverendus*, worthy of respect). Courtesy title bestowed on ministers of all denominations. In the Church of England archbishops are styled Most Reverend, bishops Right Reverend, and deans Very Reverend. Priests and deacons and Nonconformist ministers are styled Reverend throughout the British Empire and

in the United States. In Scotland, the moderator of the General Assembly is styled Right Reverend, and the principals of the universities, if in orders, Very Reverend. In Roman Catholic countries priests are styled Reverend Father, and abbesses and prioresses Reverend Mother. See Clergy.

Reversing Layer. In astronomy, a layer or stratum in the sun's atmosphere of mixed vapours, which are at a lower temperature than the actual solar surface. The spectrum of the sun is ordinarily crossed by a very large number of dark lines. According to theory they are produced by the absorptive effect of incandescent gaseous substances in the sun's atmosphere. These gaseous materials are themselves glowing, but the lines they produce are relatively dark against the more brightly glowing background of the sun.

On the occasion of an eclipse the sun's brightness is cut off; and, as was first seen at the eclipse of 1870, the spectrum hitherto crossed by dark lines becomes suddenly covered with bright ones, as if the dark lines had become reversed. This phenomenon was attributed by Professor Young to the presence of the so-called reversing layer, the thickness of which he estimated as about 600 miles. Alternative explanations of the absorption have been offered by Sir Norman Lockyer, but the reversing layer's objective reality seems to have been demonstrated by a photograph taken at Novaia Zemlia in the eclipse of 1896, and repeated at other eclipses since.

In meteorology, the term is also used for a particular layer of the earth's atmosphere. Though the temperature of the earth's atmosphere decreases regularly with height for some eight to ten miles above the earth's surface, at that height a stratum is reached at which temperature ceases to fall. Above this layer, the terrestrial reversing layer, the temperature again falls regularly. See Fraunhofer Lines; Photosphere; Spectroscopy; Sun.

Reversion (Lat. *revertere*, to turn back). Term used in English law. It denotes the estate which remains in a grantor after the determination of a particular estate granted by him. Thus A, the owner in fee simple of a house, grants a lease to B for 99 years. A is said to have the reversion expectant on the determination of the lease. If B in his turn grants a sub-lease to C for 21 years, B again has the reversion expectant on the determination of the sub-lease. A's reversion is called a freehold rever-

sion, and B's a leasehold reversion. It is quite competent for A to grant another lease, to come into force after the expiration of B's lease, and such a lease is called a reversionary lease.

Reversion to type is a biological phenomenon to express the reproduction of an ancestral characteristic. It may happen in two ways. The individual may revert towards an ancestor through the loss of some power of development in the germ-cell from which he sprang. Secondly, he may reproduce an ancestral characteristic which has been missing in recent generations. Reversions to type occur occasionally when domestic varieties of animals are crossed experimentally, but they also arise in pure-bred individuals. Thus, in purely bred races of pigeons of every kind known in Europe, blue birds occasionally appear, which is a reversion. Archdall Reid regards feeble-minded people as instances of reversion to a pre-human mental state, but the reversion here is not complete, for while the imbecile has lost his power of reason, he has not regained the instincts which would guide him otherwise. See Atavism; Biology; Heredity.

Revetment. Term used in military engineering to indicate any material which is used as a retaining wall to support earth at a steeper slope than the natural angle at which it will stand unsupported. The natural angle at which earth will stand is about 45 deg., and consequently revetment is required in the case of most entrenchments and other field works. Grass sods built into a wall and secured by pickets make an effective revetment, but generally are not available in sufficient quantity. Sandbags can be similarly employed or stakes driven into the ground and interwoven with brushwood, wire netting, expanded metal, etc., or planks placed behind them, but the latter are liable to become dangerous missiles, if high explosive shells burst near them. Canvas stretched behind and secured to a row of stakes is also effective, whilst the various forms of gabions are largely employed. Hurdles make a good revetment for a long, straight run, and fascines are used as a revetment for special purposes to which they are adapted, particularly for steps. See Entrenchment, Fascine; Fortification; Gabion.

Review of Reviews. THE British monthly periodical. It was founded Jan., 1890, by W. T. Stead (*q.v.*), to provide a synopsis of the best articles in the reviews and magazines of the month, together with a survey of current

events, character sketches and portraits of notable men and women, reviews of books, and a selection from contemporary caricatures. In 1921-22 Sir Philip Gibbs (*q.v.*) was editor. Its success led to the foundation of an American edition, which was edited by Albert Shaw, in 1891, and an Australian edition, edited by Rev. W. H. Fitchett, in 1892.

Revising Barrister. One appointed under the Registration of Electors Act to investigate claims and objections to the admission of names on the register of persons entitled to a parliamentary vote. In England the revising barristers were barristers of seven years' standing, appointed annually by the lord chief justice in London, and throughout the country by the senior judge on the summer circuit. They held courts between Sept. 8 and Oct. 12, and appeal lay from their decision to a divisional court of the king's bench. The office of Revising Barristers is now abolished, and appeal is to the county court. In Scotland the revision of the register is carried out by the sheriffs, subject to appeal to the registration appeal court.

In Ireland the registers of voters are prepared under the Registration (Ireland) Rules, 1899, revision being performed for the county and city of Dublin by revising barristers appointed by the lord-lieutenant, and elsewhere by the county court judges and chairmen of quarter sessions. See Barrister; Election; Registration.

Revival (*Lat. re, again; vivere, to live*). Term used for a recovery of any kind, for instance a revival of culture or a revival of trade. In a religious sense it refers to any movement for promoting and awakening religious zeal and enthusiasm. Examples are the Franciscan revival in the 13th century, and the Wesleyan revival in the 18th. In its more modern sense the term is used for movements among the evangelical denominations—especially in the Free Churches—in which great outbreaks of fervour have accompanied the meetings conducted by popular preachers. Among these may be mentioned the work of Moody and Sankey in 1874, and the Welsh revival under Evan Roberts in 1905-6. In 1921 a religious revival among the fishing population of Scotland and in E. Anglia was reported. See Methodism; Moody, D. L.; Wesley, J.

Revival of Learning. European movement from the 14th to the 16th century, consisting of a renewed interest in and knowledge of the Greek and Latin lan-

guages, literatures, and antiquities. An important phase of the Renaissance, it began about 1350 with Petrarch and others. Learned Greeks taught in Italy, Greek and Latin classics were rediscovered, and monastic education was replaced by that based on Humanism. The invention of printing powerfully aided the movement, which had spent its force in Italy by 1520 and spread northward. See Bembo, P.; Education; Erasmus, D.; Humanism; Library; Mirandóla, P. della; Petrarch, F.; Poliziano, A.; Printing; Renaissance; Reuchlin, J.

Revocation (*Lat., calling back*). In English law, taking back, annulment, or cancellation of a thing done or granted. A contract may be revoked by mutual consent before anything is done under it. A will may always be revoked; and it is frequently advisable, on making a fresh will, to say, "I revoke all former wills by me made." The authority of an agent is revoked by the death or bankruptcy of his principal. It is also used for the annulling of any law, *e.g.* the revocation of the edict of Nantes in 1685.

Revolt of Islam, THE. Poem in twelve cantos by Percy Bysshe Shelley. Originally printed in 1817 as *Laon and Cythna, or the Revolution of the Golden City: A Vision of the Nineteenth Century*, it was suppressed and published in the following year under its present title. Written in Spenserian stanzas, it has many beautiful passages, but lacks any sufficient plot to hold the interest through nearly 5,000 lines. It is a story of revolution produced by the individual genius of the hero and heroine, the Golden City being Constantinople.

Revolution (*Lat. re, again; volvere, to turn*). Term used for the motion of any body round a centre or axis, for instance the revolution of the moon round the earth. In political science the word refers to any violent political change, such as the forcible overthrow of a regular form of government. It is thus opposed to reform, which implies a gradual change carried out by constitutional methods. In England the substitution of William III for James II, although bloodless, is known as the great revolution. Other examples are the French Revolution, the American Revolution, and the overthrow of the tsarist regime in Russia in Mar., 1917. The change that turned Britain from an agricultural into a manufacturing country is known as the Industrial Revolution (*q.v.*). See England: History; French Revolution.

Revolver. Pistol with a revolving cylinder, comprising a group of cartridge chambers, capable of firing a number of shots without reloading. The principle of revolving barrels is of considerable antiquity, and a few specimens of flint-lock revolvers are known. The complication was, however, too great for firearms of that nature to have much vogue, and the advent of the percussion cap was necessary for the revolver to become a success.

The "pepper-box," one of the earliest varieties, is fairly well known. It had four or six barrels, generally all bored in the same block of metal, which rotated round a central axis as the hammer was worked. The development of the revolver is chiefly due to the efforts of Colonel Colt, who devoted much time to the subject from 1835 onwards. By that date he had produced a very efficient weapon having one barrel and a revolving cylinder with six chambers. The latter were muzzle-loading and the hammer had to be cocked by hand for each shot, *i.e.* the revolver was of the type known as "single action." They were extremely reliable and very accurate.

Breech-loading revolvers began to appear about 1850. By 1870 most revolvers were breech-loading, and central fire ammunition had been introduced. It had displaced all other varieties for the larger calibres, although at the present time pin-fire ammunition is used in large numbers of cheap Belgian revolvers, whilst rim-fire is paramount for .22 calibre. Up to 1890 most revolvers were of the solid frame type, the empty cartridge cases being ejected one at a time through a slot in the end plate by means of a sliding pin, and all were single-acting.

The self-ejecting type of weapon was invented by Smith and Wesson, the barrel and cylinder together pivoting on the frame, the action of "breaking" the revolver causing a flange on the end of the cylinder to rise and throw out all the empty cases. Double-action revolvers, *i.e.* those in which a long pull on the trigger cocks the hammer and then lets it fall to fire the shot, also became general about the same time. In ejecting mechanism of this type it is essential that the catch holding the barrel to the top of the frame be of very sound construction, and many experts hold the view that this type of construction is unsafe for a weapon of greater calibre than .32. The Colt system overcomes this objection by the use of a solid frame, that is, the barrel and frame are con-



constructed from one piece of metal, the cylinder being carried in a small sub-frame, mounted on an axis at its lower edge so that the cylinder may be swung out sideways, and all the empty cases ejected by pressing one pin. A revolver of this type is perfectly safe when using the most powerful cartridges. The calibres in most common use in England are .22, .320, .380, and .455, the latter being the military weapon. The smallest size is of little value except as a target weapon, where it has a great vogue owing to the ammunition having been thoroughly standardised for the miniature rifle, and being comparatively cheap. The .380 is the smallest calibre which can be relied on to stop an assailant.

In recent years the revolver as a pocket weapon has been to a certain extent replaced by the automatic pistol, which is more portable and gives more rapid fire. The lower velocity of the revolver bullet, however, makes it more efficient for stopping an assailant; a miss-fire is also a matter of much less consequence, and, in general, a revolver is much more reliable, particularly where a weapon is required for heavy use, or where it is liable to become dirty.

Good shooting with a pistol is largely a matter of physical fitness and good nerves. There are two styles of shooting: (1) Slow, deliberate shots for accurate work against a target, and (2) rapid firing with a lower standard of accuracy. The latter style is the one that is required for the soldier and for self-defence, but the preliminary training for both styles is the same, and rapid firing should not be attempted until a fairly high standard has been attained in deliberate shooting. For the preliminary work a pocket pistol is of little value, and a long-barrelled target pistol or revolver designed for great accuracy is desirable. It is best to start with a small calibre weapon, either .22 or .320, as there is practically no recoil from these, and the novice gains confidence. In holding a revolver the right arm should be practically straight, the thumb extended as far as possible along the left side of the weapon, and pressure applied to the lowest point of the trigger by the first finger.

Revolver. 1. Colt's original type. 2. Smith and Wesson 6-chamber pattern, with single round enlarged to show blunt lead bullet. 3. Self-extracting safety revolver, opened for ejector to throw out spent rounds. 4. Webley-Fosbery automatic service pattern, in which body recoils on frame to revolve chamber

Practice should begin on a standard 2-in. bullseye on the 12-yard range, taking a rather full sight. The fore-sight should be clearly seen in the back-sight; the revolver must be perfectly upright and level, and it is essential always to take exactly the same aim for successive shots, the sights being alined on the bottom point of the bullseye, technically called a six o'clock aim. When ready to fire, all the muscles of the arm and shoulder should be braced, a deep breath taken, and the trigger pressed by squeezing steadily with the whole hand. The 20-yard range should next be used, and, if the group of shots in the last practice was far from the bull, the sights of the weapon should be adjusted by an expert. Practice should be continued to attain a small group at the longer range and to become accustomed to firing, so that there is no flinching at the recoil. All this firing should be done by cocking the hammer for each shot, double-action firing not being attempted until the shooter is proficient in the simpler method.

Considering the second style of shooting, where speed is the more important point, the ideal to be striven for is to put all the shots in a revolver into a 12-inch circle within 20 seconds. It is necessary to practise until one is able to shoot instinctively, as there is no time to take a proper sight. Always bring the pistol back to the aim, immediately after it has been thrown off by the recoil.

If revolvers or pistols are to remain in good order it is essential that they be thoroughly cleaned after use, since modern smokeless

nitro powders leave an acid residue which quickly causes rust unless it is cleaned away. The special "nitro-solvents" sold for this purpose are a combination of a mineral oil with alkali which neutralises the residue. See Ammunition; Bullet; Cartridge; Firearms; Gun; Gunpowder; Pistol; Rifle.



Revue. Form of theatrical production. Of French origin, it grew very popular in London during the second decade of the 20th century. In its earlier form, in Paris, produced generally in December, it was a review, satirical and frivolous, intermingled with song and dance, of the events and fashions and preoccupations of the year—*Revue de fin d'année* was the full designation. Latterly, revues have been produced at all seasons, and have become heterogeneous musical entertainments, largely dependent for success on the personalities of the performers.

Revue Des Deux Mondes. French bi-monthly review. Founded originally in 1829, it was re-organized by François Buloz (1803-77) in 1831. Originally literary, it now combines literature with politics, and publishes work by the most distinguished Frenchmen of the day. Under the editorship (1893-1906) of Ferdinand Brunetiere (*q.v.*) it was particularly influential. In 1921 its editor was René Doumic, and it contained a regular political survey by Raymond Poincaré.

Rewa. British hospital ship. She was torpedoed and sunk without warning in the Bristol Channel, Jan. 4, 1918. Three of the Lascar crew were lost, but all the wounded were transferred to patrol vessels that had gone to her assistance before she went down. At the time of being torpedoed she was displaying all the lights and marks of a hospital ship as required by the Hague Convention.

Rewah. Native state and town of Central India. It is a large state in the hilly division of the eastern

portion of the agency of Bagelkhand. The chief rivers are the Sone and the Tons. The main crops are rice, millet, and wheat, but much of the land is covered with forest. The state has been under British influence since 1812. Its area is 13,000 sq. m. Pop. 1,515,000. Its capital, the town of Rewah, is 75 m. S.W. of Allahabad. Pop. 26,000.

Rewakantha. Agency of native states in India, in Bombay Presidency. It comprises Rajpipla, Chota Udaipur, Bariya, Lunavada, and many smaller states to a total number of 60, and forms part of the Gujarat group of agencies. It lies to the N.E. of Baroda and is crossed by the rly. from Baroda to Ratlam, and by the Mahi river. There are considerable areas of forest. The natives are chiefly Bhils and Kolis. Its area is 4,956 sq. m. Pop. 665,000.

Reward. Voluntary recompense for voluntary service. In law, where an advertisement is published, offering a reward to anyone who does something, e.g. gives certain information or restores lost property, anyone who does the act is legally entitled to the reward. In other words, there is a valid contract. It is a punishable offence to advertise a reward for the return of stolen property, "no questions asked," for this is condoning a crime. The Corrupt Practices Act, 1883, prohibits the offering of a reward to a voter for his vote, and here reward means not only money, but money's worth, e.g. employment.

Rewari. Town of the Punjab, India, in Gurgaon dist. It is a rly. junction 32 m. S.E. of Gurgaon. The town is of great antiquity, but owes its present importance as a trading centre in iron, salt, sugar, and wheat to British influences. Fine turbans and brass and pewter vessels are the chief manufactures. Pop. 24,800.

Reybaud, MARIE ROCH LOUIS (1799-1879). French author. Born at Marseilles, Aug. 15, 1799, he spent some time in Asia before becoming a journalist in Paris. Holding advanced views, he took part in politics and was in the Chamber of Deputies, 1846-51. He died in Paris, Oct. 28, 1879. Reybaud's reputation rests upon his writings, especially his satires put into the mouth of Jérôme Paturot. He wrote also books on industrial and economic subjects.

Reyer, ERNEST (1823-1909). French composer. Born at Marseilles, he became a public servant in Algeria. There he produced his first opera, after which, settling in Paris, he devoted himself to music.

Of his operas the most notable are *Maitre Wolfram*, 1854, *La Statue*, 1861, and especially *Sigurd*, 1884. He wrote on music for the *Journal des Débats*, and among his books is *Forty Years of Music*, 1909. Reyer died Jan. 15, 1909.

Reykjavik. Town and seaport of Iceland, the capital of the island. It stands on the Kollafjord, an opening of the S.W. coast. The chief buildings are the cathedral,



Reykjavik, Iceland. Parliament buildings and, right, the cathedral

governor's house, observatory, library, museum, and hospital. The building where the parliament of Iceland meets contains a library rich in historical works. Most of the houses are built of wood. In the largest square in the town is a statue of Thorwaldsen. There is steamer connexion with Copenhagen, and from here fish, butter, and skins are exported. Pop. 16,000. See Iceland.

Reynard the Fox. Ancient animal legend or beast fable. Apparently of Oriental origin, with the fox as hero by reason of his superior cunning over the other animals, its satirical qualities grew with its European development. It is traceable in Germany to monastic Latin of the 10th century. There was a metrical version, *Reinardus Vulpes*, afterwards called *Isengrimus*, by a Flemish priest, Nivardus of Ghent, in 1148; and in 1180 another, *Isengrene's Not*, or *Reinhart Fuchs*, in Middle High German, by an Alsatian, Heinrich de Gliechezäre. Early in the 13th century a French priest, Pierre de St. Cloud, composed a poem on the subject, which inspired a Flemish poem, *Reinaert*, by J. F. Willems. A prose work, *Die Hystorie van Reynaert de Vos*, by Gerard Leeu, was printed at Gouda, Holland, 1479, from the Low German of which Caxton made a translation in 1481. The earliest printed German edition is one published at Lübeck in 1498. Goethe's *Reinecke Fuchs*, 1794, is a free version in hexameters of the Low German poem. There is an estimate of the comic and satirical qualities of the work

in Carlyle's miscellaneous essays. A poem of the chase by John Masefield is entitled *Reynard the Fox*.

Bibliography. Reynard in South Africa, Dr. Bleek, 1864; *Le roman de Renart*, E. Martin, 1882-87; *Die Hystorie van Reynaert de Vos*, W. J. Müller and H. Logeman, 1892; Reynard the Fox, J. Jacobs, 1895; *Les Sources du roman de Renart*, L. Sudre, 1893; reprint of Caxton's trans., ed. E. Arber, 1895; metrical version, F. S. Ellis, 1897.

Reynolds, SIR JOSHUA (1723-92). British painter. He was born July 16, 1723, at Plympton in Devonshire, his father, Samuel Reynolds, being master of the grammar school in that place. In early days he was intended for the medical profession, but showing aptitude for painting, was sent from home in 1740, and placed in the studio of Hudson, the best portrait painter of his day. After a while he returned to Devonshire, where he painted a considerable number of portraits, but in 1744 was back again in London, and five years afterwards went out in the *Centurion* to the Mediterranean. He visited Lisbon, the Balearic Islands, Leghorn, Florence, and Rome, remaining in the latter place for two years, studying the works of the Italian masters. He then made a tour through other parts of Italy, and went to Paris. On his return to England he settled in London, in 1760 finally establishing himself in Leicester Square, where he remained until his death, making, however, occasional visits to Devonshire.

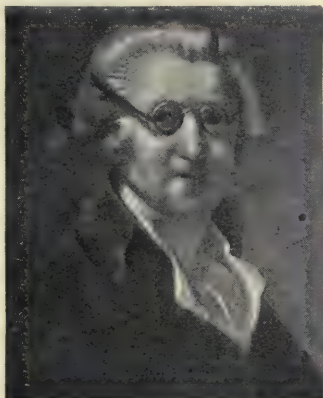
Reynolds was an exceedingly popular man in the best London society of the period, personally acquainted with everyone who was worth knowing. His intimate friend was Dr. Johnson, whose death in 1784 was a severe blow to the artist. Others were Burke, Garrick, and Goldsmith, and it was Reynolds who, in 1764, suggested the formation of the Literary Club; in 1765 he became a member also of the Society of Dilettanti. When the Royal Academy was founded in 1768 Reynolds became its first president, and received the honour of knighthood, and for the next 20 years exhibited in its gallery some of his most notable pictures. He was responsible for the foundation of the Royal Academy Schools, and delivered his first discourse to the

students in 1769. The foundation of the Royal Academy banquet was also due to him, and he it was who suggested the appointment of some of the eminent men of the day to act with the Academy as honorary professors.

He resigned his presidency of the R.A. in 1790, but was persuaded by his colleagues to resume the high position. A year afterwards, however, he became blind, and in 1792, on Thursday, February 23, he died. He was buried in the crypt of St. Paul's Cathedral.

Reynolds was the great English master of portraiture. An unerring draughtsman, a wonderful colourist gifted with a profound sense of decoration, and a graceful humour, his portraits represent the finest of English art in its grandest form.

His best pictures have, as a rule, been the subjects of engravings, nearly 800 contemporary plates having been prepared from his



Self-portrait

work. Many of his pictures have suffered by reason of the strange experiments he tried in order to obtain the greatest brilliancy, but it has been wisely said that even a faded picture by Reynolds is greater than the works of any of his contemporaries. Fine examples of his pictures may be seen in the National Gallery, Wallace Collection, National Portrait Gallery, and Royal Academy, and in the private collections of Miss Alice de Rothschild, the duke of Devonshire, Lord Iveagh, the duke of Westminster, and J. P. Morgan, and also in many of the great private galleries of the U.S.A. See Abingdon, F.; Anson, Baron; Art; Billington, E.; Burke, E.; Devonshire, Duchess of; Fox, C. J.; Gibbon, F.; Goldsmith, O.; Hamilton, E.; Hunter, E. J.; Johnson, S.; Percy, T.

G. C. Williamson

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Reynolds, Mrs. Louis Baillie. British novelist. Born at Teddington, daughter of Julian Robins,



Mrs. Baillie Reynolds,
British novelist
Elliott & Fry

she was educated in London and, as G. M. Robins, became known as a skilful writer of novels of contemporary life. In 1890 she married Louis Baillie Reynolds. Among her novels may be mentioned *Keep My Secret*, 1886; *The Tree of Knowledge*, 1889; *The Ides of March*, 1892; *Phoebe in Fetters*, 1904; *The Daughter Pays*, 1916; *A Castle To Let*, 1917; and *The King's Widow*, 1919.

Reynolds, SAMUEL WILLIAM (1773-1835). British engraver. Born in London, July 4, 1773, he studied under C. H. Hodges. At first he painted in oils, and between 1797 and 1827 exhibited several portraits and landscapes at the Academy, but his true *métier* was mezzotint engraving, his teacher being John Raphael Smith. He engraved more than 300 portraits after Sir Joshua Reynolds, Lawrence, Opie, Northcote, Phillips, Dance, and others; and subject pictures after George Morland, Northcote, and several contemporary French painters. He was accomplished in etching, stipple, and aquatint, and was fond of combining one or more of these methods with mezzotint in one plate. He died in London of paralysis, Aug. 13, 1835.

Reynolds, WALTER (d. 1327). English prelate. Aided to ecclesiastical preferment by Edward I, he became a favourite of Edward II, who made him bishop of Worcester, 1307, sent him on a mission to Avignon, 1309, and made him lord chancellor in 1310. He attended the Council of Vienne, 1311, and in 1314 became archbishop of Canterbury. His private life and his

political influence were open to criticism, but he effected several ecclesiastical reforms. Reynolds crowned Edward III in 1327, and died at Mortlake, Nov. 16, 1327.

Reznicek, EMIL NIKOLAUS VON (b. 1861). Austrian composer. Born in Vienna, May 4, 1861, he studied under Reinecke at Leipzig. Musical director at Mannheim Court Theatre, 1896-99, and at the Imperial Opera, Warsaw, 1907-8, he became conductor of the Komische Oper, Berlin, 1909. He has composed several operas, notably *Die Jungfrau von Orleans*, 1887, successful light operas, among which are *Donna Diana*, 1894, and *Eros und Psyche*, 1917, pieces for orchestra and incidental stage music, church music, songs, and pianoforte works.

R.F.A. Abbreviation for Royal Field Artillery. See Artillery, Royal Regiment of.

R.G.A. Abbreviation for Royal Garrison Artillery. See Artillery, Royal Regiment of.

R.H.A. Abbreviation for Royal Horse Artillery. See Artillery, Royal Regiment of.

Rhabdomancy (Gr. *rhabdos*, rod; *manteia*, divination). Divination by means of a rod or twig, and the discovery of water or veins of ore by the same method. See Divining Rod.

Rhadamanthus. In Greek mythology, the son of Zeus and Europa, and brother of Minos, king of Crete. On account of the uprightness of his life he was made one of the judges of the dead in Hades, the others being Minos and Aeacus.

Rhaetia OR **RAETIA.** Province of the Roman empire lying S. of the Danube and corresponding roughly to the greater part of Tirol with the adjoining Grisons of Switzerland. Conquered by the Romans under Drusus in 15 B.C., at this period most of its inhabitants were Celtic. See Rome.

Rhaetian Alps. Section of the Eastern Alpine system. They extend into Italy, Switzerland, and Austria, and include the Bernina, Albula, and part of the Ortler Alps, and were named from the Roman prov. Rhaetia. The loftiest peak is the Piz Bernina, alt. 13,304 ft., and the chief pass the Splügen, nearly 7,000 ft. in alt. See Alps.

Rhaetic Beds. In geology, name given to those rocks found at the top of the Triassic and at the base of the Jurassic. The rocks show the characteristics of both the Triassic and the Jurassic, and were so called from their occurrence in the Rhaetian Alps. They consist of shales, limestone, marls, and sandstones, and contain many fossils, including those of some of



S. W. Reynolds,
British engraver
After J. Opie

the earliest known mammals. They are widely distributed, occurring in Great Britain, Europe, Asia, America, and Australasia.

Rhallis, DEMETRIOS (1841-1921). Greek statesman. Born at Athens, he became prominent in politics in 1890, when chosen leader of the new Young Greek party. In April, 1897, he became premier following the fall of the Delyannis ministry after the Greek defeats in Thessaly, resigning in Oct. President of the chamber Feb.-July, 1903, he was premier in the latter month, resigning in Dec. He was again premier, June-Dec., 1905, and in 1909. In 1915 he was minister of justice, in 1916-17 minister of finance. Throughout the Great War he sided with King Constantine against M. Venizelos. He was premier from Nov., 1920, to Feb. 5, 1921, and died Aug. 19, 1921.

Rhamnaceae OR BUCKTHORN FAMILY. Large natural order of trees and shrubs. Natives of warm and temperate regions, they have undivided leaves and small green or yellow flowers. They have purgative properties, and some of the species are used in medicine and in dyeing. See Buckthorn (*Rhamnus*).

Rhamnus. Ancient city of Greece, in Attica. It was a port on the N.E. coast, 24 m. N.E. of Athens and 8 m. N.E. of Marathon. It had several temples, notably one of Nemesis, built about 450 B.C.; another was dedicated to Dionysus. Excavations have revealed remains also of a theatre and a fine statue of Themis.



Rhatany. Foliage, flowers, and seeds; inset, single flower

Rhamphorhynchus (Gr. *ramphos*, crooked beak; *rhynchos*, snout). Extinct flying reptile. One of the Pterodactyls, little is known about it, the only remains being found in the fine-grained lithographic stone of Bavaria, and those only consisting of part of the wings. See Pterodactyl.

Rhampsinitus. Classical name of the Egyptian Rameses the Third. He is chiefly remembered

in connexion with the story told of his treasure-house by Herodotus. The architect left a secret way into the treasure-house for his own enrichment, and at his death bequeathed the knowledge to his two sons, who promptly made use of it. Rhampsinitus tried by many stratagems to discover who robbed him, but was always outwitted by the thief. In various forms the story—that of the Master Thief cycle of tales—is found among many different peoples. Pausanias, in his Description of Greece (Bk. ix, 37), gives a similar account of the treasure-house of one Hyrieus.

Rhapsodists. In ancient Greece, professional reciters of the Homeric or other epic poems. The earlier rhapsodists sang to a harp, the later chanted the poems. Such recitations were a great feature of Greek life, and the reciters were held in high esteem. See Greek Literature.

Rhapsody (Gr. *rhaptein*, to sew together, compose; *ōdē*, ode). Fragment of an epic poem recited by a minstrel. A rhapsody in the modern sense is a musical composition of the fantasia type, generally founded on some national air, though not necessarily in variation form. Standard examples are by Brahms, Henselt, and Liszt. Generally, the term implies any extravagant utterance or composition.

Rhatany (*Krameria triandra*). Shrub of the natural order Polygalaceae. It is a native of Peru. It has alternate, oval, leathery leaves, covered with silvery hairs. The flowers are bright scarlet and irregular in form. The dried root with its red-brown bark is well-known in medicine, affording a form of tannic acid used as a tonic and as an astringent. The infusion is blood-red. *K. argentea*, from Brazil, with purple-brown bark, is used for the same purpose.

Rhayader. Market town of Radnorshire, Wales. It stands on the Wye, with a station on the Cambrian Rly., 14 m. from Llanidloes. It is chiefly an agricultural centre, having been long famous for its sheep fairs. The town grew up around a castle built about 1180 by the English to defend the district against the attacks of the Welsh. The chief building is S. Clement's Church, a Gothic building restored. The scenery around the town is very beautiful. Near are the valleys of the Elan and the Claeuwen, wherein are the huge reservoirs that supply Birmingham with water. The name means in Welsh the falls of the Wye, there having been a waterfall here at one time. Pop. 1,000.

Rhea. In Greek mythology, daughter of Uranus, Heaven, and Ge, the Earth. She was the wife of Cronos (*q.v.*), by whom she was the mother of Zeus, Demeter, Hera, Poseidon, and Pluto. Rhea, originally a Cretan divinity, became early identified with the Phrygian goddess of nature and fertility, Cybele, whose worship at Pessinus was conducted with clashing cymbals and extravagant Oriental rites. In art, Rhea is represented as wearing a mural crown, and with lions either sitting by her throne or drawing her chariot. See Atys; Corybantes.

Rhea OR AMERICAN OSTRICH. Genus of running birds. They occur only in S. America and resemble small ostriches except that the head and neck are feathered, the feet have three toes instead of two, and the tail is rudimentary. Three species are usually recognized, the common rhea, Darwin's rhea, and the long-billed rhea. The general colour of the plumage of all three is grey, but it differs in tone and the species vary in size, the common rhea being the largest. The birds are found in small companies on the plains, several hens consorting with a cock and laying in a common nest. As in the case of the ostrich, the cock bird undertakes the task of incubation. The birds are extremely fleet of foot, and their colour makes it difficult to see them at even a moderate distance. They are hunted by horsemen armed with the bolas, a cord with a stone or weight at each end, and their feathers are used for making brooms.



Rhea. South American running bird allied to the ostrich

Gambier Bolton, F.Z.S.

Rhea Silvia OR ILIA. In Roman legend, the mother of Romulus and Remus by the god Mars. Being a vestal virgin vowed to perpetual chastity, she was thrown into the Tiber by her uncle Amulius, but, according to one tradition, she was saved by, and became the wife of, the river-god. How her sons avenged the treatment of their mother is told under the entry Romulus. She is identified with the Greek Rhea, whose epithet *Idaea*, like the Latin *Silvia*, means "of the forests." See Romulus.

Rheims. Anglicised name of the French city, Reims (*q.v.*).

Rheine. Town of Westphalia, Germany. It stands on the Ems, 29 m. from Osnabrück. An industrial centre, it is also a rly. junction and a river port, the Ems being navigable from here. Since 1815 it has been part of Prussia. Pop. 14,400.

Rheingau. District of Germany, in the prov. of Hesse-Nassau. It stretches along a fairly broad valley from Biebrich to Lorch on the right bank of the Rhine. It is one of the most beautiful districts of Germany, and, owing to its sheltered position among the hills, it produces some of the most excellent wines of the Rhine. Fruit is also extensively cultivated. The chief town is Rüdesheim.

Rheostat (Gr. *rhein*, to flow; *statos*, fixed). In electricity, an adjustable resistance to control the flow of electric energy through a circuit. It is the electrical counterpart of a steam or water valve. A common form of rheostat used for starting motors and controlling the strength of a magnetic field is as follows. An arm, moved by an insulated handle, is mounted at one end on a spindle in connexion with the circuit. The other end describes a circular path, and sweeps a number of brass studs set closely together. Each stud has connexion with its neighbour through a wire coil or bar of metal of high resistance, and that at one end of the series is joined up to the circuit. In the zero position the arm is off the studs; when it touches the first stud the current is admitted through all the resistances in series, and as it passes from stud to stud the resistances are cut out in succession until the last stud is reached and all obstruction removed.

The liquid rheostat has an insulated plate dipping into a bath of acidulated water or an alkaline solution, such as common soda or sal ammoniac and water, with a low but sufficient conducting power. A metallic lining to the bath (or another plate at the

bottom of the bath) and the movable plate form the poles of the circuit. Lifting the plate out of the bath breaks the circuit altogether. As it is lowered and a larger surface is exposed to the liquid, the flow of current increases. Finally, the plate makes contact with a copper stud in direct connexion with the lining of the bath, and all resistance is cut out.

The starting switches of railway, lift, and other motors are generally provided with a time control, which renders it impossible for the full current to be admitted suddenly and burn out the windings. See Electricity.

Rhesus OR BENGAL MONKEY (*Macacus rhesus*). Small long-tailed monkey of the family *Cynopithecidae*, common throughout N. India. It is usually nearly 2 ft. long in body, with a tail varying from 6 to 8 ins. Its fur is brown, with a greyish or greenish tinge, and the bare parts of the face are red in old specimens. Around Simla it occurs at considerable ele-



Rhesus or Bengal monkey, a semi-sacred animal common in N. India
W. S. Berridge, F.Z.S.

vations among the mountains. It is regarded as a semi-sacred animal by many of the Hindus, and may be found in considerable numbers in the precincts of certain temples. It feeds mainly on fruit and seeds, but will also eat insects. In captivity it displays great intelligence, and is in favour as a pet, while its hardy constitution recommends it to the street organ-grinder.

Rhetoric (Gr. *rhetorikē*). Originally the art of speaking effectively in public, and later extended to include the effective presentation of words either in oratory or writing. It has been defined as "that art or talent by which the discourse is adapted to its end."

The earliest treatise on rhetoric is that of Aristotle (4th century B.C.), in which it is regarded as a branch of logic, and as the means of establishing the superiority of

truth over falsehood. Earlier rhetoricians had claimed that the end of rhetoric was to convince, whether rightly or wrongly; but the Aristotelian view came to be generally accepted. The three chief elements of rhetoric as applied to oratory were regarded as invention, arrangement, and elocution, though some writers on the subject included memory and utterance, both of which might be supposed to be included in the three named. There have been many modern works on rhetoric, such as Wilson's *Art of Rhetoric*, 1553, new ed. 1909, which was long popular; Campbell's *Philosophy of Rhetoric*, 1776; Blair's *Rhetoric and Belles Lettres*, 1817; Whately's *Elements of Rhetoric*, 1828; Cope's *Introduction to the Study of Aristotle's Rhetoric*, 1867; and Aristotle's *Rhetoric*, Eng. trans. Jebb and Sandys, 1909. See Oratory.

Rheumatic Fever. Acute disease due to an infective agent which has not yet been isolated. Children and young adults are most commonly affected. There is some hereditary tendency to the disease, and exposure to cold or wet may be the precipitating factor. The symptoms generally begin abruptly, but may have been preceded by pains in the joints, sore throat, and inflammation of the tonsils. The temperature rises to 102° F. or more; then in a few days one or more of the joints become swollen, hot, painful, and reddened. Usually one of the large joints is affected first. The knee and ankle are the joints most frequently affected, but any joint may be involved. As the symptoms subside in one joint they may appear in another. There may be a reddish rash on the skin. Involvement of the heart is a frequent and serious complication. In many cases small nodules of about the size of a pea appear under the skin.

The course of the disease is very variable, and the convalescence may be delayed for a month or more. A fatal termination is rare, but permanent disease of the heart is very apt to remain, and there may also be changes in the joints lasting for a long period. The essential feature in the treatment is to keep the patient absolutely at rest, so as to diminish the strain on the heart. The diet should be light. The affected joints should be wrapped in cotton-wool, and when the pain is severe hot cloths saturated with an anodyne lotion should be applied to them. Fixation of the joints with padded splints often gives relief. As internal medicines, salicin or salicylates and potassium acetate and citrate are largely used.

Rheumatism (Gr. *rheumatismos*, flux or rheum). Term popularly used for painful affections of the muscles or joints. It embraces, from the physician's point of view, several distinct conditions, among them arthritis. Acute rheumatism is equivalent to rheumatic fever (q.v.). Originally, the word denoted a catarrh or flow of rheum. See Arthritis; Fibrositis, etc.

Rheumatoid Arthritis or **ARTHRITIS DEFORMANS**. Disease of the joints, the exact cause of which is unknown, but is probably infection. Exposure to cold and wet, and dyspepsia are possibly sometimes precipitating causes. The onset may be acute or chronic. In the acute form the symptoms resemble those of rheumatic fever, the joints becoming swollen and painful. The chronic form is more common, the first symptoms being pain and swelling in a joint. Gradually other joints become involved. As the disease progresses, the tissues of the joints undergo various changes, with the formation of bony out-growths. Ultimately the joint may become stiff and the muscles atrophy. In many cases the disease appears to become arrested after a certain stage has been reached, and life may be prolonged for years.

Treatment consists in maintaining the general health and giving a nourishing diet. Massage and medicinal baths are often useful. Salicylates or potassium iodide may be prescribed. Counter-irritation of the joints by the application of blisters, mustard, and iodine is often serviceable. Fixation of the joints for short periods or during the night may be useful, but care should be taken to maintain the mobility of the joints by exercises and massage.

Rheydt. Town of Prussia, in the Rhine province. It stands on the Niers, 20 m. from Düsseldorf, and is a rly. junction. It is an industrial town, chiefly engaged in the making of textiles, with dyeing and other attendant industries. There are also distilleries and breweries. The town was only a village until the 19th century, when its position near the coal mines of Westphalia made it a manufacturing centre. Pop. 44,000.

Rhine or **RHEIN**. European river. It rises in Switzerland, flows between France and Germany, then through Germany and Holland to the North Sea, after a course of 800 m. The headstreams, Vorder Rhein and Hinter Rhein, originate close to the sources of the Rhône and Reuss, and the combined stream passes between Switzerland and Liechtenstein N. to Lake Constance.

Below the lake it flows W., and plunges over the falls near Schaffhausen and at Zurzach, and receives the Aar before it reaches Basel. Here it is 190 yards wide, and navigable, and turns sharply N. to the wide plain of the rift valley, where it separates Alsace from Baden. In this plain section it receives the Ill, Neckar, and Main, and passes Strasbourg, Mannheim, and Mainz.

Between Mainz and Bingen the Rhine flows W., and between Bingen and Bonn it flows N.W. through the romantic scenery of the Rhine gorge, between vine-clad, castle-crowned slopes, which

traffic, has so many people in its valley, or such important manufactures. Steamers tow large cargo barges upstream from the docks at Rotterdam to Strasbourg, whence the Rhine-Rhône canal is preferred to the swift river as far as Basel. Canals connect the Rhine navigation with the Meuse, Seine, Saône, Danube, and Ems.

At the beginning of the historic period the Rhine valley was being gradually wrested from the Celts by the Germans. Julius Caesar stemmed the invasion, and he and his successors made the middle and lower Rhine the military frontier of the Roman Empire.

The river was a great trade route, and many small princes built their castles on its banks, and exacted shipping dues, a practice not entirely abolished till 1869. France gained a footing on the upper Rhine by the Peace of Westphalia in 1648, and her possession of Alsace, confirmed by the Peace of Ryswick in 1697, gave her a Rhine frontier, extended by Napoleon I to the sea in 1801, though in 1814 all the left bank, except Alsace-Lorraine, was given up. The Germans made it wholly German from the Swiss to the Dutch frontier in 1871. France recovered the upper Rhine



Rhine. Map of the territory drained by the river, including part of the basin of the Maas

are so close as to leave bare room on either bank for a road and a railway; in this section the chief city is Coblenz, at the mouth of the Moselle. Below Bonn the river enters the great European plain, and bears gradually W. to the sea; Cologne and Düsseldorf are the chief German cities, and Rotterdam is the great Dutch port on the delta. The Ruhr and the Lippe are the chief lower tributaries. The distributaries of the delta leave the main stream almost as soon as Holland is reached; these are Waal, Yssel, Lek, Crooked or Old Rhine, and Vecht. The Meuse joins the Waal distributary.

The Rhine is in many respects the greatest river on the Continent; no other river carries so much

frontier by the treaty of Versailles. The treaty contained various provisions dealing with the control of the Rhine, which, it was decided, should be a free waterway under an international commission. See Bingen; Bonn; Ehrenbreitstein; Germany; Lorelei; Versailles, Treaty of; consult also The Rhine: Its Valley and History, H. J. Mackinder, 1908; The Navigable Rhine, E. J. Clapp, 1911.

Rhine-Hanover Canal. Projected canal system across the N. German plain to connect the waterways of the Rhine, Ems, Weser, and Elbe. These waterways lead N. to the North Sea, and the proposed route is to provide an E.-W. passage for barges from Magdeburg to Düsseldorf.

Rhineland, RHINE PROVINCE OR RHENISH PRUSSIA. Province of Prussia, Germany. It lies between Holland and Lorraine, Westphalia and Luxemburg, and is the most densely peopled province of the state. Rye, wheat, oats, and barley are grown extensively; the vine flourishes in the valleys of the Rhine and the Moselle. The Ruhr coalfield is the basis of the great industries of the Düsseldorf dist.; the Saar coalfield is in the S.W. (See Saar Basin.) Iron, zinc, lead, and copper are mined and textiles are woven. Cologne is the largest city, Coblenz is the capital. Its area is 9,470 sq. m. Pop. 6,769,000.

The idea of an independent Rhineland republic, begun after the Great War, resulted in its proclamation on Oct. 21, 1923, at Aix-la-Chapelle. The Separatist movement spread to other towns, but later showed signs of collapsing.

Rhine-Rhône Canal. Waterway of France providing river and canal connexion between the Rhône and the Rhine. Starting from St. Symphorien, on the river Saône, it passes S.E. to the Doubs, which it follows until it passes S. of Belfort to Mulhouse and enters the Rhine basin. From Mulhouse it passes N. to Strasbourg. Constructed between 1783-1834, it is 193 m. in length.

Rhinitis (from Gr. *rhis*, nose). Inflammation of the mucous membrane of the nose. Acute catarrhal rhinitis may be the familiar cold in the head, or may be caused by irritating gases, dust, or pollen of plants, catarrh due to the last being spoken of as hay fever.

Chronic rhinitis occurs in two forms. In the hypertrophic form there is thickening of the tissues covering the bones in the inside of the nose, which may cause some obstruction to respiration. In dry chronic rhinitis there is little discharge, and the exudation dries and forms crusts on the tissues.

Rhinoceros (Gr. *rhinos*, of the nose; *keras*, horn). Genus of large ungulate mammals, confined to Central and S. Africa and S. Asia, and once common in Europe, including Great Britain. Five species are usually recognized, of which three occur in Asia. Their most obvious distinction from all other mammals is the presence of one or two horns in the middle line of the face. But these are not horns in the same sense as those of the ox. They have no connexion with the bones of the skull, but consist of agglutinated masses of horny fibres or hairs growing out of the skin. The rhinoceros belongs to the odd-toed group of ungulates, or hoofed mammals, and has three

sub-equal toes on each foot and no projecting snout.

The Indian rhinoceros has one horn, and is distinguished by the thick tuberculed skin, which is folded in places and has something of the appearance of an ancient coat of plate armour. It stands a little over five feet high at the shoulder, and is of very heavy and clumsy appearance. It is found in swampy spots in the jungle, and is usually timid and inoffensive. It has been known to live over 50 years in captivity, and in a wild state it probably completes its century. The Javan and Sumatran

Rhizopoda (Gr. *rhiza*, root; *pous*, foot). Word used by zoologists for the class which includes the lowest members of the protozoa or primitive animals. It includes such organisms as the amoeba, radiolaria, and mycetozoa. They are characterised by having no rind or containing integument around their body protoplasm, and by throwing out pseudopodia.

Rhoades, JAMES (1841-1923). British poet. The son of Rev. J. P. Rhoades, rector of Clonmel, he was born April 9, 1841. He was educated at Rugby and Trinity College, Cambridge, where he won the



Rhinoceros. One-horned species found in Indian jungles, distinguished by its thick folds of skin, resembling folds of plate armour

Gambier Bolton, F.Z.S.

rhinoceroses are smaller in size, and the skin is smooth and inclined to be hairy. The latter species has two horns, usually short.

The black rhinoceros is a native of Africa, and ranges from Abyssinia to Cape Colony, being usually found in thickets near streams. It has two horns, and the skin is smooth and almost hairless. The upper lip is prolonged and pointed, and, being somewhat prehensile, is used for grasping the leaves and twigs on which it chiefly feeds. Notwithstanding its great bulk, it is agile, and usually makes off with great speed when alarmed.

The white rhinoceros is the largest of all, and sometimes attains a height of over six feet at the shoulder. It lacks the pointed upper lip of the black species, and has a tuft of hair at the tip of each ear. The front horn is sometimes about a yard long, the other being much shorter. It occurs in the S. Sudan, the Congo Free State, and S. of the Zambezi river. It feeds entirely upon grass, is usually found in pairs, and is a very dangerous foe if molested. See Animal; Ice Age.

chancellor's medal for English verse, and became a master at Haileybury College in 1865. From 1880-93 he was a house-master at Sherborne. Rhoades wrote several volumes of verse and the narrative choruses for the pageant at Sherborne, and translated Virgil into verse. He died Mar. 16, 1923.

Rhode Island. State of the U.S.A. One of the original thirteen, it is the smallest of all, its area being 1,248 sq. m., or only a little larger than Gloucestershire; of this 180 sq. m. is covered with water. The surface is fairly level in the S., with plains and swamps along the coast, but hilly, without becoming mountainous, in the N. and E. Narragansett Bay extends inland for 30 m. and contains several islands, from one of which the state derives its name. There are several summer resorts, including Newport. A little farming is conducted, but the chief industrial interests of Rhode Island are its manufactures, especially cottons, woollens, worsteds, and jewelry; and dyeing, bleaching, and calico printing occupy large

numbers of the people. Some minerals are worked, and fishing is carried on. Two senators and two representatives are sent to Congress. Providence is the capital; other large towns are Pawtucket and Woonsocket.

Various settlements were made during the 16th century, in what is now Rhode Island, chiefly by persons exiled for religious reasons from Massachusetts. In 1647 the four existing settlements—Providence, Portsmouth, Newport, and Warwick—were united. In 1663 a charter was obtained, and as Rhode Island the district was under English rule until the war of independence. Its inhabitants then took up the American cause, and Rhode Island became one of the 13 original states. Pop. 604,400.

Rhodes (Gr. *Rhodos*). Most easterly island in the Aegean Sea, sometimes included in the Dodecanese. It lies 12 m. from the coast of Asia Minor and is 43 m. long and 20 m. wide. The N. is fertile, the S. elevated, so that during the rainy winter season torrents rush

down the slopes to the sea. The principal products are fruit, wine, onions, soap, and kaolin, from which crude pottery is made.

Known under various names in ancient times, it was probably called Rhodos from its extensive cultivation of roses (Gr. *rhodon*). The oldest inhabitants were the mythical Telchines, who were succeeded by Phoenicians and Dorian immigrants from Argos. Its three chief towns, Lindus, Ialysus, and Camirus—with Cnidus and Halicarnassus in Asia, and the island of Cos—formed what was known as the Doric hexapolis, or league of six cities. The island rapidly became flourishing, founded Gela in Sicily and other colonies, but first acquired political importance when the three towns in 408 B.C. built a new city called Rhodos, which became the capital of the island.

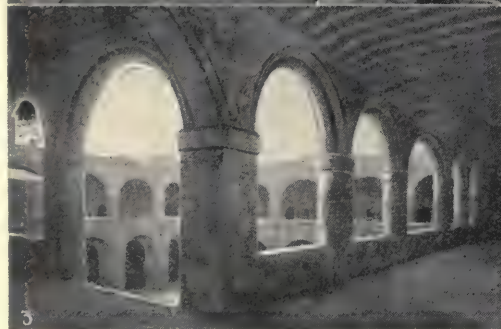
Alternately attached to Athens and Sparta, it lost its independence in the time of Alexander the Great, regained it after his death, and soon became a thriving commercial centre. Its code of maritime laws was later adopted by the Romans and through them by modern Europe. Science and art flourished. The Rhodian school of rhetoric, distinguished by its florid style, and originally founded by Aeschines (q.v.), was attended by

Cicero. Its school of art was founded by Chares of Lindus, who fashioned the bronze statue of Helios (see Colossus). Other representatives were Athenodorus (see Laocoon) and Apollonius and Tauriscus of Tralles, who executed the group known as the Farnese bull (see Dirce).

For their loyal support of Rome during her wars against the Seleucid emperors of the East, the Rhodians were rewarded with mercantile privileges and a considerable increase of territory, which later were partly taken away owing to their suspicious attitude. However, the island enjoyed a semi-independence until the time of Vespasian, when it was merged in the province of Asia. Later included in the Byzantine empire, from 1309–1523 it was the headquarters of the Knights Hospitallers, being captured in 1523 by the Turks.

The island was occupied by Italy during the Italo-Turkish War of 1912. By the treaty of Sèvres, Italy received Rhodes and neighbouring small Dodecanese islands. Pop. 31,000.

Rhodes. Capital of the island of Rhodes. Situated in the N.E. corner of the island, it is a port of call for Levant steamers. Its principal interest is in the remains of the Knights Hospitallers. Among these are the castle; the Street of the Knights, which contains remains of the houses of assembly of the Knights Hospitallers, several of which bear the armorial devices of the countries to which the inmates belonged; and the Grand Hospital of the Knights, restored by the Italian government and converted into a museum in 1914. Pop. 10,000.



Rhodes. Scenes in the historic town of the Aegean island. 1. Street of the Knights, containing the old houses of the Knights Hospitallers. 2. Entrance to the castle. 3. Cloisters and upper gallery of the Grand Hospital, now a museum. 4. Façade of the hospital, as restored in 1914

CECIL JOHN RHODES

Ian D. Colvin, Author of *South Africa, The Germans in England, etc.*

For fuller information see the articles South Africa; South African War; Transvaal; also British S. Africa Co.; Rand. See further Groote Schuur; Imperialism; Kruger; Jameson Raid; Matoppo Hills; also the articles following on Rhodesia and Rhodes Trust

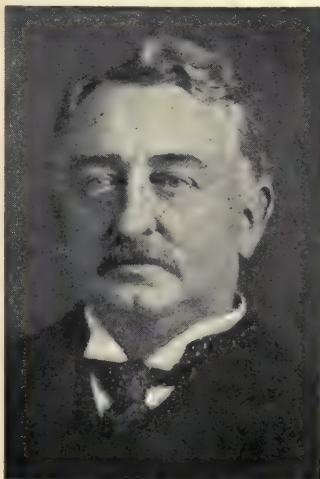
Cecil John Rhodes was a son of the vicar of Bishop's Stortford, Hertfordshire, where he was born July 5, 1853. He was educated at the grammar school of his native town. At the age of 17 he went to Natal, where his eldest brother, Herbert, was planting cotton. Herbert was one of Captain Rolleston's party which discovered diamonds on the banks of the Vaal river in Jan., 1870, and Cecil joined the diamond diggers after winding up the cotton plantation. The diggers gradually developed two separate mines or pipes—the De Beers and the Kimberley—which were in the early years a maze of individual claims. The necessity of amalgamating these claims brought Cecil Rhodes to the front, and after a long financial conflict with Barney Barnato, he amalgamated the two mines under the name of De Beers in Jan., 1889.

In his first years at Kimberley Rhodes found time to keep his terms at Oriel College, Oxford, graduating in Dec., 1881. In the same year he joined the Cape Parliament as one of the two members for Kimberley. He entered Parliament, as there is excellent evidence for saying, with ends already formed in his mind, ends no less than the creation of a British Africa from the Cape to the Zambezi. In his first session Rhodes engineered the defeat of Sir Gordon Sprigg, and under the Scanlen ministry obtained power which he used to secure for the Cape Colony control of Bechuanaland. This effected by a series of masterly negotiations, Rhodes was in position to make use of the concessions which he had secured from Lobengula, the chief of the Matabele. In 1889 he obtained from the Imperial Government a royal charter for the British South Africa Company, and he then pushed forward the well-organized expedition which took peaceful possession of Mashonaland.

In 1893, raids by the Matabele on the Mashona brought about a war, in which the great tribe was defeated and a territory as large as France and Germany combined came under the administration of the company. President Kruger was now surrounded by British territory except for Delagoa Bay, which Rhodes had tried, but failed, to purchase from the Portuguese. At the same time Rhodes was

pressing the Cape Colony to extend its rly. system to Pretoria, and to effect a railway and customs union with the Transvaal. However, the Cape Parliament refused to accept this policy, and the wealth of the newly discovered goldfields enabled Kruger to build his line to Delagoa Bay and strengthen enormously the Republican system. Kruger was now in a position to punish the Colony for its exorbitant customs policy; but he carried matters too far when he "closed the drifts" to Cape merchandise and produce.

This action ranged the Cape Colony behind Rhodes, now prime minister. Rhodes had wrung



C. J. Rhodes

W. & D. Downey

Bechuanaland from Kruger in 1886, partly by means of the Warren expedition, which without actual fighting threatened Kruger on his weak western frontier. No doubt with this bloodless success in mind, Rhodes concentrated the Rhodesian police near the Transvaal frontier. By a stroke of policy Kruger gave way on the Drifts question, but refused any concessions to the Outlanders. Jameson thought he saw a chance of settling the whole matter at one stroke, and led his 500 troopers in a dash for Johannesburg. He was stopped after a ride of 190 miles by a burgher force within some 20 miles of Johannesburg, and he and his followers were made prisoners.

On the evening of Jan. 2, 1896, the day of Jameson's surrender, Rhodes tendered his resignation as prime minister, and shortly afterwards resigned his managing directorship of the Chartered Company. He found immediate work and solace in the task of quelling the Matabele rebellion, which had broken out upon the news of Jameson's defeat. With no authority except that of his name and moral power, he went to the Matoppo and negotiated a peace with the chiefs.

In the early part of 1897 he made out his case before the Select Committee, justifying his policy on the ground that Kruger had denied the majority of the population any share in the government of the country. But this great question, which Rhodes had failed to settle by diplomacy, had to be settled by arms. Rhodes took a place of duty and of danger at Kimberley, where he helped to organize the defence. The troubles of these latter years helped to break down his strength, and after a painful illness he died in a cottage on the seashore about 20 m. from Cape Town, March 26, 1902. He was buried in the Matoppo Hills. See *Political Life and Speeches, 1881-1900*, Vindex, 1900; *Lives*, L. Michell, 1910; T. E. Fuller, 1910; P. Jourdan, 1911; G. Le Sueur, 1913; B. Williams, 1920.

Rhodes, JAMES FORD (b. 1848). American historian. Born at Cleveland, Ohio, May 1, 1848, he was educated at the universities of New York and Chicago, and in Paris. For some time he was Paris correspondent of *The Chicago Times*, but he gave up this post to enter the iron and steel business. He remained therein until 1885, when he was able to devote himself to the study of history. He worked on a



Cecil Rhodes. House at Bishop's Stortford where the Colonial pioneer was born

History of the United States from the Compromise of 1850; seven volumes, carrying the story down



J. F. Rhodes,
American historian

to 1877, appeared 1893-1906. Written with marked impartiality, it is the best account of the eventful period of the civil war. In 1899 Rhodes was president

of the American Historical Association, and in 1913 he lectured at Oxford. He also published *Historical Essays*, 1909.

Rhodes, WILFRED (b. 1877). English cricketer. Born at Kirkheaton, Yorkshire, Oct. 29, 1877, he first played for his county in 1899, securing his place as a left-handed slow bowler. Altogether he captured 3,201 wickets, a record in first-class cricket, secured more than 200 wickets in a season on three occasions, 1900-2, and took 100 wickets and scored 1,000 runs twelve times. In 1909, 1911, and 1921 he scored 2,000 runs in addition to taking 100 wickets. He made 19 appearances in England against Australia, and several times toured in Australia.



Wilfred Rhodes,
English cricketer

Rhodes Trust. Trust established under the will of Cecil Rhodes, for the purpose of granting scholarships at the university of Oxford to students from the British Oversea Dominions, the U.S.A., and formerly, from Germany. Following Rhodes's testamentary instructions, the scholars are selected with regard to (1) literary and scholastic attainments, (2) achievements in manly outdoor sports, (3) moral qualities, and (4) exhibition of force of character, etc., in school days.

The normal yearly value of the Rhodes scholarships is £300, but in 1921 a bonus of £50 was added. Under the will, 60 scholarships were endowed for the British Empire, two for each state of the U.S.A., and five to be nominated by the German Emperor from Germany. The last named were withdrawn by Act of Parliament during the Great War. In 1923-24 the number of scholars was 220, namely, 109 from the British Empire and 111 from the U.S.A. The London office of the trustees is at Seymour House, Waterloo Place, S.W.

RHODESIA AND ITS RESOURCES

P. Evans Lewin, Author, *The Germans and South Africa*, and E. G. Harmer

See in addition the articles *Africa*; *South Africa*; *Transvaal*; also *British South Africa Co.* Other useful entries are *Mashonaland*; *Matabeleland*; *Zimbabwe*; and those on *Salisbury* and other towns in *Rhodesia*. See also *Rhodes*, C. J.

Rhodesia is a territory of British South Africa. Until Oct. 1, 1923, it was administered by the British South Africa Company. It is called Rhodesia after Cecil J. Rhodes. It is divided into two administrative provinces, S. Rhodesia, containing Mashonaland and Matabeleland, with an area of 148,575 sq. m., and N. Rhodesia, the territory lying N. of the river Zambezi, with an estimated area of 291,000 sq. m. Rhodesia is bounded on the N. by the Belgian Congo; on the N.E. by Tanganyika Territory; on the E. by the Nyasaland Protectorate and Portuguese E. Africa; on the S. by the Transvaal; and on the W. by the Bechuanaland Protectorate, a portion of the S.W. Africa Protectorate, known as the Caprivi strip, and by Portuguese W. Africa, or Angola.



Rhodesia arms

Climate and Topography

The whole of Rhodesia is tropical, but has a considerable alt., so that generally the climate is healthy and agreeable. S. Rhodesia, between the rivers Limpopo and Zambezi, mainly consists of one high plateau at an alt. between 3,500 and 6,000 ft. N. Rhodesia, in the main, represents the S. portion of the plateau between the Zambezi and the Congo, but is cut off by the deep trough of the Luangwa. Farther W. the Kafue river and its tributaries form a series of valleys between the Zambezi proper and the Luangwa. In the extreme N.E. is the Tanganyika plateau, and to the W. of this section, around lakes Mweru and Bangweulu, lies a tract of territory shut off from the rest of Rhodesia by a S.E. extension of Belgian territory. The effect of the alternation between comparatively high plateaux and river valleys is that the climate of Rhodesia varies in different districts. In the valleys and lowlands the conditions are wholly dissimilar from those in the higher portions suitable for European colonisation, which are at an alt. above 3,500 ft.

Rhodesia possesses an extensive system of navigable waterways, at present wholly undeveloped. The great rivers are navigable over certain portions throughout the year and over other sections during

certain seasons only. These sections are broken by rapids, which impede navigation, or divide the navigable areas into distinct portions.

Rhodesia is possessed of vast mineral and agricultural resources. The gold mines of Mashonaland were probably worked by the ancients. Ruins, as the Great Zimbabwe and the M'Tondele and Mazoe ruins, testify to the presence of a people engaged in mining operations. The gold belts now worked cover a large area, chiefly around Bulawayo, Gwanda, Selukwe, Hartley, Mazoe, Victoria, Lomagunda; and Umtali in the Matabeleland district. In 1915 Rhodesia ranked as the sixth gold-producing area in the world.

Other minerals, silver, lead, copper, wolfram, asbestos, and diamonds are worked, as well as coal and iron-ore. In the Wankie coalfield Rhodesia possesses one of the greatest coal regions of the world, containing coal of an exceptionally high quality. The deposits of chrome iron-ore around Selukwe yield about one-half of the world's consumption.

Although much has been done to develop agriculture, compared with the size of the country the agricultural output is small. At present it is mainly confined to districts within easy reach of rlys. The agricultural products include maize, and the staple crops of S. Rhodesia are tobacco, fruits, especially citrus fruits, and different native cereals, as Kaffir corn. The chief grain centres are in the neighbourhood of Salisbury, notably on the Gwebi flats and in the Mazoe valley, and around Victoria, and in the vicinity of the Kafue. Stock-raising is carried on in the great cattle country of Matabeleland and in Mashonaland.

Rhodesia in the main depends upon rlys. for its communication with the outside world. The chief outlets are *via* the rly. traversing the country from N. to S. from the borders of the Belgian Congo where it has been extended N. to Bukama, through Livingstone and Bulawayo, where it joins the main system to the S.; and *via* the Mashonaland-Beira rly. with its seaport at Beira in Portuguese E. Africa. The latter rly. runs from Salisbury through Umtali to the coast. The former city is connected with Bulawayo, through Gwelo, and there is,

therefore, through communication between Cape Town and Beira in one direction, and between Cape Town and the mouth of the Congo (partly by river communication) in the other. Rlys. also connect Victoria and Selukwe with Gwelo, and the Ayrshire and Abercorn districts with Salisbury. A further line runs from the Gwanda mining district to the main Rhodesian railway.

In S. Rhodesia the two chief tribes are the Matabele and Mashonas. In N. Rhodesia the W. portions, the country of the Barotse, were under the control of Lewanika, and the E. portions were occupied by unimportant tribes settled in village communities. The native pop. of S. Rhodesia was estimated at 730,000 in 1914, and that of N. Rhodesia at about 850,000. The census, 1911, showed the number of Europeans to be 23,606, but ten years later it was approximately 33,500. The chief towns are Bulawayo, the commercial centre of Matabeleland, Salisbury, the seat of the administration, Hartley, Gatooma, Umtali, Victoria, Gwelo, and Selukwe, in S. Rhodesia; and Livingstone, the administrative capital of N. Rhodesia, Fort Jameson, Fife, and Broken Hill in N. Rhodesia. Salisbury, Bulawayo, Gwelo, and Umtali are municipalities.

In 1888 the portion of Rhodesia now known as S. Rhodesia was declared to be within the British sphere of influence, and on Oct. 29, 1889, a royal charter was granted to the British South Africa Company, conferring upon it powers of administration. Subsequently, in 1891, the whole of British territory W. of the Zambezi, with the exception of the Nyasaland Protectorate, was placed, subject to certain conditions, under the control of the company. The Imperial government was represented by a resident commissioner who acted on behalf of the high commissioner of South Africa. Until 1923 S. Rhodesia was presided over by an administrator assisted by an executive council, and by a legislative

council, consisting of the administrator, six nominees of the company, and twelve members elected by voters. The first legislative council was elected in 1899.

For administrative purposes S. Rhodesia was divided into thirty districts, and N. Rhodesia, which until 1911 consisted of the two



Rhodesia. Map of the British colonial possession in Southern Africa

provinces of Barotseland, or N.W. Rhodesia, and N.E. Rhodesia, into ten districts.

ARCHAEOLOGY. The task of tracing the early movements of mankind along the highways over which S. Africa was first peopled has hardly begun. The Bushman paintings found in Mashonaland caves are not necessarily of high antiquity. The outstanding interest of prehistoric Rhodesia lies in its innumerable mine-workings, as well as in upwards of 500 ruined stone structures, scattered over an area 700 m. square between the Zambezi and Limpopo rivers. The workings, sometimes descending 150 ft., are estimated to have moved more than 100,000,000 tons of reef. The gold output necessarily reached the outside world by the E. coast, whence it was presumably transported by Arabian mariners.

Of the strongholds, which were formed of small granite or diorite blocks, some, especially at Zimbabwe, display skilful work; others, as at Dhlodhlo or Mombo, Khami, Nanatali, and Umtali, are inferior, often of undressed blocks. Some authorities explain the former as due to a pre-Bantu population, perhaps Hamitic, under Arabian direction, the latter to

Bantu-speaking negroids who imitated the old work in a clumsy style, after the original impulse had passed away.

At Inyanga are many hill-forts, besides hundreds of stone-lined pits, extensive aqueducts, and remains of stone-walled terraces. They point to a highly developed agriculture based on irrigation, and Arab influence is suggested.

In some of the structures imported objects, such as Nankin china, Cambay beads, and Indian fabrics, betray medieval trading activity. According to D. Randall-MacIver, nothing older than the 14th century A.D. has been identified, and all the constructions, even at Zimbabwe, are unaided Bantu work.

In 1921 a fossil skull discovered in the Bone Cave at Broken Hill appeared to relate to the most primitive human remains hitherto found in Asia and Europe, and to confirm the presence of man in S. Africa in remote times.

E. G. Harmer

HISTORY. If the period of the Portuguese missions in the 16th century be disregarded, European intercourse with Rhodesia commenced with the missionary travels of David Livingstone, who in June, 1851, reached the central Zambezi at Sesheke, and the hunting expeditions of William Cotton Oswell. Subsequently Livingstone, with Sir John Kirk, explored the Zambezi as far as the Barotse country, and in 1866 discovered Lakes Bangweulu and Mweru, the S. end of Lake Tanganyika, and the upper course of the Luapula-Lualaba-Congo. The country was traversed by a few Boer and British hunters, as Viljoen, Martin Swart, John Lee, and Schinderhutte; Fairbairn and Dawson, two young Scots traders who established a store at Bulawayo; and George Westbeek, who traded in the Barotse regions. Two mission stations were established among the Matabele, previous to the conquest by Britain, near Bulawayo, but the main stream of missionary effort followed in the wake of Livingstone.

In 1872 Lobengula's kraal was visited by F. C. Selous, who subsequently travelled through the country and was of the greatest assistance to Cecil Rhodes. On Feb. 11, 1888, a treaty was made with Lobengula by Rhodes's agent J. S. Moffat, and subsequently on Oct. 30, 1888, another treaty was signed by the Matabele chief and by C. D. Rudd, Rochfort Maguire, and F. R. Thompson. Under the command of Col. Pennefather and the leadership of F. C. Selous, the pioneer expedition of about 500

men left Mafeking on May 18, 1890, established a post at Tuli, founded the first outpost in Mashonaland (Fort Victoria) on Aug. 14, and on Sept. 12 occupied the spot now known as Salisbury, where the Union Jack was hoisted.

The first administrator of Mashonaland, A. R. Colquhoun, was succeeded on Sept. 18, 1891, by Dr. (later Sir Leander Starr) Jameson. Troubles occurred with the Matabele, and on Nov. 4, 1893, their capital at Bulawayo was occupied, after the Matabele had been twice defeated and Lobengula had fled. In March, 1896, the natives again revolted, and after a prolonged struggle the rebellion was subdued in Sept., 1897.

During the Great War Rhodesia rendered important service to the empire by securing its borders against invasion, and by furnishing two regiments of European infantry for distant service.

The important decision of the judicial committee of the Privy Council, delivered in Oct., 1918, established the fact that the land in Rhodesia is the property of the crown; and a royal commission, under Lord Cave, was appointed to determine the compensation due to the Chartered Company.

Responsible government was instituted in S. Rhodesia on Oct. 1, 1923. There is a governor appointed by the crown and a Legislature of two Houses. The settlement of 1923 provided for the payment of £3,750,000 by the British Government to the shareholders of the British South Africa Company. The latter then ceased to be responsible for the administration of the territory, and for that of N. Rhodesia as from April 1, 1924.

P. Evans Lewin

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Rhodian Ware. Class of glazed pottery, also known as Turkish ware. It was made in Rhodes, and at Nicaea, Kutaya, and elsewhere in the Turkish empire. The best ware, especially tiles and dishes, was produced in the 16th and early 17th centuries. The ground is generally pure white, with bold designs in blues, greens, etc., outlined with a dark pigment. Particularly

characteristic is the decorative use in relief of a red clay pigment, known as Armenian bole. Sometimes this covers most of the white ground. Persian motives are frequent, though the Turkish treatment of flowers is broader and more naturalistic. The glaze is unusually thick. See Rhodes.

Rhodium (from Gr. *rhodon*, rose). One of the rare metallic elements, chemical symbol, Rh; atomic weight, 102.86; specific gravity, 12.1; melting point, 2,000° Cent. (3,632° Fah.). When pure it is insoluble in acids or *aqua regia*, is attacked by chlorine and sulphur, oxidises on surface when heated, and vaporises in electric furnace. It is hard, ductile, malleable at red heat, white with a bluish tinge resembling aluminium.

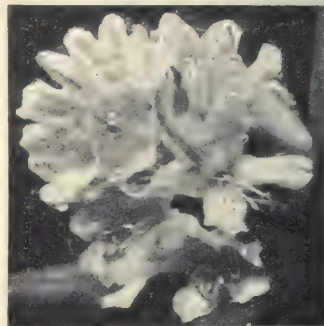
Discovered in 1804 by the English chemist, William Hyde Wollaston, in platinum sands from the Ural Mountains, it is one of the platinum group of metals and is always found in native platinum, and generally with that metal in the Urals and S. America. It is also found in nickel-copper ores of Sudbury, Canada, and elsewhere, and, alloyed with gold, in rhodite in Mexico. Specimens of the latter carrying 34 to 45 p.c. rhodium are recorded.

Rhodium is used for preparation of thermo-electric couples of electrical pyrometers, and for tips of gold pens. The monoxide is used in the preparation of thoriaceria gas mantles.

Rhodochrosite. Mineral manganese carbonate. It is usually adulterated with various other minerals, chiefly iron, calcium, and zinc. Red in colour, whence its name, it is found associated with

manganese, silver, lead, and other metallic ores, in Transylvania, Colorado, etc. It is used in the manufacture of ferromanganese.

Rhododendron (Gr. *rhodon*, rose; *dendron*, tree). Genus of evergreen shrubs and trees of the natural order Ericaceae. They are natives of the East Indies, China, Japan, India, the mountains of Europe, and N. America, and have been introduced into Britain at various dates since 1656, when *R. hirsutum*, the hairy alpenrose, came from Switzerland. The tender kinds need ordinary greenhouse treatment in pots, at an average temperature of 50° F. to



Rhododendron. Flower cluster of the hardy shrub

60° F., during the winter and early spring, and they may be placed out of doors during the summer months. The more important hardy species may be planted anywhere, in good soil that is free from lime, while many kinds prefer peat.

They may be planted at any time in autumn or spring, and should be mulched after flowering in May with well-rotted manure. The flowers are of all shades and colours, except blue. The hardy purple-flowered rhododendron, *R. ponticum*, is an excellent subject for the wild garden, and miscellaneous belts of shrubs on the outer ring of cultivation, and also in newly made woods as a covert plant. Rhododendrons are propagated by seeds or by layers taken in spring or autumn. Choice seedlings are sometimes grafted upon *R. ponticum* and other robust species. There are over 200 species.

Rhodonite (Gr. *rhodon*, rose). In mineralogy, name given to a manganese silicate belonging to the pyroxene group of minerals, in which part of the manganese has been replaced by iron, calcium, or zinc. The mineral has a glassy appearance, is some shade of red in colour usually, and is found in Scandinavia, Germany, Russia, N. America, etc. Some varieties are cut and polished for gem stones.



Rhodian Ware. Turkish jug with blue background, 16th century

By courtesy of the Director, Victoria and Albert Museum

Rhodopé Mountains. Outlying chain of the Balkans (*q.v.*), partly in Macedonia and partly in Thrace, extending S.E. from the Sofia district towards Adrianople and the Aegean Sea. The loftiest peak is Muss-Alla Dag, alt. 9,613 ft. S.E. of this rises the range Dospad Dag (Bulg. Despoto Dag), a name sometimes applied to the parent chain. Other peaks are Jel Tepe (8,796 ft.), Rilo Dag (8,790 ft.), Vitosha (7,515 ft.), Sitke Dag (7,177 ft.).

Rhodopis. Greek courtesan who lived at Naucratis in Egypt, whither she had been brought as a slave. Charaxus, brother of the poetess Sappho (*q.v.*), met her there and became so enamoured of her that he paid a large sum of money to have her set free. This roused the anger of Sappho, who attacked Rhodopis in one of her poems. The Cinderella story that Psammetichus III, king of Egypt, found her shoe and was so struck by its daintiness that he made her his wife, is chronologically impossible.

Rhonchi (Lat. *rhonchus*, snorting). Sounds heard either through the stethoscope or by placing the ear to the chest, in persons suffering from bronchitis. They are due to partial obstruction of the air passages, by swelling of the mucous membrane, or the presence of thick secretion.

Rhondda. River of Glamorganshire, Wales. It is formed by the confluence of the Rhondda-fach and Rhondda-fawr, and flows 15 m. S.E. to the right bank of the Taff at Pontypridd. It passes through the Rhondda Valley, one of the chief mining valleys of S. Wales.

Rhondda OR YSTRADYFODWG. Urban dist. of Glamorganshire, Wales. It stands in the valley of the Rhondda, 7 m. from Pontypridd and 16 from Cardiff, and is served by the G.W. and Taff Rlys. The chief buildings are the various parish churches and other buildings for divine worship, the offices of the district council, and several public halls. The great industry is the mining of coal. This began to be worked about 1870, and in 1877 an urban district was formed, the name of this being changed from Ystradyfodwg, that of the original parish, to Rhondda in 1897. It includes Tylorstown, Pentre, Cymmer, Ferndale, Treherbert, Dinas, Porth, and Tonypanddy, and is now one of the most populous urban districts in the country. In 1885 it became a division sending one member to Parliament, but in 1918 the urban district was given the right to send two. Pop. (1921) 162,729.

Rhondda, DAVID ALFRED THOMAS, VISCOUNT (1856-1918). British merchant and politician. Born at Aberdare, March 26, 1856, his father, Samuel Thomas, was a successful grocer who later became interested in collieries. The son was educated at Clifton and at Caius College, Cambridge, after which he entered business in S. Wales. Possessing the qualities needed to take advantage of the opportunities then offering in S. Wales, he soon became one of the leading men in the coal and allied trades. The Cambrian Combine, of which he was the head, employed 20,000 miners, and he was also a



Viscount Rhondda,
British politician
Elliott & Fry

director of some undertakings in S. Wales.

In 1888 Thomas entered Parliament as Liberal M.P. for Merthyr, and therein he sat continuously until 1910, the last few months for Cardiff, but he did not make a successful politician, and he retired a disappointed man. In 1916 he was made a baron, and in Dec. he joined the coalition ministry as president of the local government board. In June, 1917, he accepted the position of food controller, and he was successful in a difficult and thankless task, but it broke him physically and on July 3, 1918, he died. He had just been made a viscount. He and his daughter were saved when the Lusitania was torpedoed when returning from the U.S.A., where he had been in connexion with the supply of munitions, and where he went again in the same year (1915).

Lord Rhondda's title passed

to his daughter, Margaret Haig (b. 1893), who succeeded to many of his positions, and became known as an advocate of women's rights. In 1908 she married Sir Humphrey Mackworth, Bt. In 1922 her petition to the king to be allowed to sit in the House of Lords was rejected. See D. A. Thomas, Viscount Rhondda, Lady Rhondda, 1921.

Rhône. River of Switzerland and France. It rises in the Rhône glacier, between the Furka and Grimsel Passes, in the Bernese and Pennine Alps, and flows, a rushing mountain stream, into the Lake of Geneva. Passing through the lake, it emerges at Geneva, flows S.W. and S. to a point 18 m. W. of Chambéry, where it turns N.W. and W. to Lyons. Joined there by the Saône, it flows practically due S. to Arles, where it breaks into two main branches, the Petit Rhône and the Grand Rhône, and several lesser streams, which enclose the delta known as La Camargue, with an area of about 300 sq. m., and so reaches the Mediterranean.

The chief tributaries of the Rhône are the Ain, Saône, Isère, Drôme, Ardèche, Eygues, Durance, and Gard. Its valley is naturally of great economic importance, and



Rhône. Map of the area drained by the river and its tributaries. Inset, Marseilles-Rhône canal

among the towns on its banks are Brigue, Geneva, Lyons, Vienne, Valence, Avignon, and Arles. From the sea to Lyons navigation, though difficult in parts, is active; above Lyons the traffic is smaller. The Rhône is connected by canal with the Rhine, Loire, Yonne, Seine, and with Marseilles. Between the Swiss frontier and the sea the French government decided in 1921 to establish 18 power stations, of which the largest is to be at Genissiat. From them electric current will be supplied to Paris, to the P.L.M. Rly., and to industrial undertakings. The river is to be canalised with 30 locks and a barge lift at Genissiat. Its total length is 504 m., about 160 m. being in Switzerland. See Geneva; Rhine; Marseilles-Rhône Canal.

Rhône. Dept. of France. It lies contiguous with the depts. of Saône-et-Loire, Loire, Isère, and Ain, and is the smallest dept. in area save the Seine. It is hilly and has many picturesque tracts, notably in the Monts du Beaujolais, de Tarare, and du Lyonnais. The stony soil is generally unfertile, except in the Rhône and Saône valleys, but the vine is successful in the Beaujolais and the S. parts, and the mulberry, used for silkworms, is important. The dept. is chiefly industrial, the great silk industry centring in Lyons, and there are engineering and iron works, muslin, chemical, and glass factories, stone quarries, iron, copper, and coal mines. The rivers include the Rhône, Saône, Azergues, Vauxonne, Ardère, Yzeron, and Garon. The towns include Lyons (the capital), Villefranche, Vaugneray, Tarare, Beaujeu, St. Laurent, Amplepuis, Thizy, and Givors. Its area is 1,104 sq. m. Pop. 915,600, of whom 523,800 are in the city of Lyons.

Rhubarb (from Gr. *rhêon baron*, barbarian *rhêum*). Edible-stalked herbaceous plant of the natural order Polygonaceae, genus *Rhêum*, a native of Siberia. The stalks are stewed and eaten as a sweet, but the roots possess valuable medicinal properties. Preparations of rhubarb are employed largely for disorders of the stomach and of digestion in children. Rhubarb will flourish in any soil that is not waterlogged. Well-rotted stable manure should be dug deeply into the ground before planting, and basic slag and phosphate of lime must be applied if the ground is deficient in these necessary chemical constituents. Autumn planting may be resorted to, but it is better to plant in the spring-time, and pull no stalks of the rhubarb during the first season.

It is a mistake to take too many stems from any particular plant during any one season, as this weakens the root.

Rhubarb can be forced in the open air by covering the young plants with drain-pipes, or similar articles, and packing the exteriors or bases of these receptacles with fermenting manure. Roots of three-year-old plants may be forced by placing them in a dark position under the staging of a greenhouse, or in a house devoted to the culture of mushrooms. Propagation is usually and simply carried out by a division of the roots, which are severed by a sharp knife into as many pieces as will allot a crown to each fragment.

Rhubarb may also be raised from seed sown in the autumn in the open air, though this is not a usual method of increase. There are several varieties, one of the most noteworthy of which is Champagne rhubarb, from which, in some localities in England and France, an effervescing beverage is made. This is said to form the basis of many brands of cheap champagne. *R. officinale*, and some other species, are grown in the margins of shrubberies, in deep rich soil, as ornamental plants, for the sake of their bold leaves. They are useless for edible purposes.



Rhubarb. Leaves and flowering spike of *R. rhaiponticum*, the common edible species

Rhubarb leaves are poisonous to animals, and should not be thrown within the reach of cattle. They are equally dangerous to human beings. The stalks of rhubarb are extensively used in the making of jam, and sometimes in the form of pulp for addition to fruit used in jam making.

Rhuddlan or RHYDDLAN. Town of Flintshire, Wales. It stands on the Clwyd, 8 m. from Denbigh, with a station on the L. & N.W. Rly. It is famous for its castle, now in ruins. This was built in the 11th century, and in it Edward I held a parliament in 1283. St. Mary's Church is an old building.



Rhuddlan, Flintshire. Ruins of the castle seen from across the river Clwyd
Frith

A bridge, dating from the 16th century, leads across the river to Rhuddlan Marsh, where, it is said, Offa of Mercia defeated the Welsh Caradoc in 795. Rhuddlan was once a flourishing seaport. The encroachment of the sand, however, destroyed its prosperity, and the borough privileges given by Edward I fell into disuse. Pop. 1,900.

Rhumb Line. Straight line described by the course of a ship sailing steadily towards the same point of the compass. Ocean routes are usually plotted on maps drawn on Mercator's projection, because the chief value of that map is that the straight line drawn between any two points preserves the same compass bearing, i.e. is a rhumb line. The word rhumb is a variant of Lat. *rhombus*. See Navigation.

Rhyl. Urban dist. and watering-place of Flintshire, Wales. It stands at the mouth of the Clwyd, 30 m. from Chester, with a station on the L. & N.W. Rly. The attractions include good sands, pier, and winter gardens, and there are several establishments for



Rhyl. Seal of the urban district council



Rhyl, Flintshire. East Parade from the High Street
Frith

invalids. Rhyl was a fishing village before it developed into a watering-place in the 19th century. Pop. 9,000.

Rhyme OR **RIME** (Anglo-Saxon, *rim*, probably from Gr. *rhythmos*, rhythm). In poetry, the repetition, at the end of one or more lines, of the sound or combination of sounds at the end of another line. In English verse the last stressed vowel and all the following sounds of each rhyming line are identical, the preceding consonants being different, whereas in French verse the latter may be identical (rich rhyme), provided that the words are not the same. In masculine rhymes the final syllable alone rhymes; feminine rhymes consist of a stressed followed by an unstressed syllable. Triple rhyme, with two unstressed syllables, is used in English poetry mainly for comic or grotesque effect. Internal rhyme, viz. within the limits of a single line, is common in ballads. Many modern poets prefer inexact rhymes, to avoid machine-like regularity.

As a natural means of marking and enriching rhythm, rhyme arose independently among various races. Outside Europe, it is used by the Chinese, Hindus, Arabs, and others. Intimately associated with accentual metre, it was avoided in Greek and Latin poetry, which followed the rules of quantitative metre, and reappeared in Latin verse in the 4th century A.D., when the native instinct for accent reasserted itself. Medieval Latin hymns were probably the main source of rhyme in the W. European literatures. In English and other Teutonic languages it slowly replaced alliteration from the 9th century to the 15th. With the revival of classical learning a prejudice arose against rhyme, and many experiments were made with unrhymed metres, but until recently none had established itself except blank verse. See Blank Verse; Couplet; Poetry; Prosody; Quatrain; Vers Libre.

Rhymer's Glen. Glen near Melrose in Roxburghshire. Huntly Burn flows through it, and its name is due to the story that here Thomas the Rhymer met the queen of the fays.

Rhymney OR **RUMNEY.** River of England and Wales. Forming the boundary between Monmouthshire and Glamorganshire, it flows 30 m. S. to the Bristol Channel, which it enters 2 m. E. of Cardiff.

Rhymney. Urban dist. of Monmouthshire, England. It stands on the Rhymney, 2 m. from Tredegar, with stations on the G.W. and Rhymney Rlys. All around are rich coal mines, and the place has important iron and steel works. Pop. 11,400.

Rhyolite (Gr. *rhein*, to flow; *lithos*, stone). In geology, name given to an acid lava of porphyritic texture and siliceous composition. Those in which soda is present as a large percentage are called soda rhyolites, and when the rock is compact and massive it is termed rhyolite porphyry. The rock may be glassy, like pumice stone, scoriaceous or vesicular, and is found in many volcanic regions. The name was suggested by Richter from the characteristic flow-structure of the rock. See Liparite.

Rhys, Sir John (1840-1915). Welsh philologist. Born June 21, 1840, in Cardigan, and educated at Jesus



Sir John Rhys,
Welsh philologist
Russell

College, Oxford, he continued his studies at the Sorbonne and in Germany, and became an inspector of schools in Wales. In 1877 he was appointed professor of Celtic at Oxford, and in 1895 principal of his old college, a post he retained until his death. He was a great authority on Celtic inscriptions. He also took great interest in all matters connected with Wales, such as education and land reform. His most important works are Lectures on Welsh Philology, 1877; Celtic Britain, 1882; The Welsh People, 1900; The Celtic Inscriptions of Gaul, 1911-13. He died Dec. 18, 1915.

Rhythm (Gr. *rhythmos*, measured motion, symmetry). Periodicity of processes, motions, or sounds. Rhythm is a fundamental fact of life, consisting in the alternating preponderance of the two antithetical processes of waste and repair, of discharge and restitution, of activity and recuperation. As stated by Professor Pfeffer in his Physiology of Plants, all life is rhythmic in character, each life-cycle being a repetition of a preceding one, and during the progress of the grand period of each individual various periodic movements occur in growing and adult organs. Further, all metabolism consists of rhythmically recurrent processes of anabolism and catabolism. In addition to this autogenic rhythm regularly repeated external factors may induce a secondary rhythm, and the phenomena observed in nature are the result of the cooperation of these two forms of rhythm.

In its more general connotation rhythm is one of the three essential elements of music, the others being harmony and melody, and it is the distinguishing characteristic of dancing. Resulting from the intimate association of poetry with music, all verse having originally been composed for intoning to the harp or singing to the pipe or lyre, rhythm draws the capital distinction between poetry and prose, which is the vehicle of thought intended to be spoken. Verse, whether rhymed or unrhymed, is written in metre and strict rhythm, on its technical side thus becoming a subject for the grammarian, of whose science the laws of versification form part under the name of prosody (*q.v.*).

Prose, on the contrary, is written without constraint of metre, and in rhythm so various as to have defied all attempts to reduce it to rule. Nevertheless, rhythm is an integral, not an accessory, part of good prose, at once the effect and the cause of emotion in polished oratory, and providing for the finest thought a diction perfectly apt, because possessing a musical cadence of a beauty in harmony with the truth expressed. Freedom from law is the distinguishing characteristic of prose rhythm, and it falls short of perfection by precisely so much as it is the product of mechanical devices such as antithesis, parallelism, and the rest. The curious may study the matter in such works as Thomson's The Basis of English Rhythm, and Saintsbury's A History of English Prose Rhythm. The wise will steep themselves in the Authorised Version of the Bible. See Music, Poetry; Prose.

Rhythm. In music, term used in varying but inter-related ways. Being measured, it implies subdivision, proportion, and periodicity as applied to notes, beats, bars, and phrases. (1) As in verse, so also in music, the alternation of strong and weak units (beats) is an essential characteristic. The number of weaker beats intervening between the occurrence of the stronger ones differentiates one time from another. Thus in the following example are shown in simple beats duple, triple, and quadruple times:



Here are accent and periodicity, but no rhythm. But where music differs from verse is in the much greater freedom with which its beats can be sub-divided. Thus the following is, as regards time, fundamentally the same as the first of the above examples, but the form of each beat is varied rhythmically, thus displaying the quality of proportion:



(2) Just as a bar consists of a grouping of beats with respect to accent, so a musical phrase is a grouping of the bars, which in themselves are also divided like beats into accented and unaccented, the termination of a phrase being marked by the occurrence of a cadence. According to the number of such bars, the phrase is said to be in two or four bar rhythm, as the case may be. Though phrases of other lengths are often to be found in artistic music, the two or four bar rhythm is so predominant that it is often regarded as fundamental. In reality, however, it is no more natural than other rhythms, its greater frequency being due to its simplicity and consequent ease of apprehension. See *Short Treatise on Musical Rhythm*, M. Lussy, Eng. trans. E. Fowler, 1909.

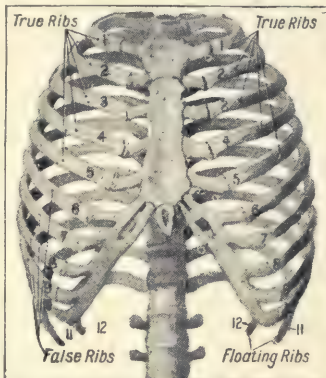
R.I. Abbrev. for the Royal Institute of Painters in Water Colours.

Ria (Span., mouth of a river). Long, narrow inlet in the Galician coast of Spain. The name is used for the inlets formed by the submergence of a region of mountain ridges separated by valleys. The sunken ridges become rocky promontories separating tapering rias, which, unlike fiords, shallow continuously the farther they penetrate into the land. Bantry Bay, Kenmare River, and Dingle Bay in Ireland, and Falmouth and Plymouth Sounds in S.W. England, are examples of rias.

Riajsk. Town of Central Russia. It is in the govt., and 60 m. S.E., of Ryazan, on the Khupta, and an important junction on the Moscow-Kozlov rly. There is considerable trade in grain. Pop. 15,000.

Riau-Lingga. Archipelago in the E. Indies, forming a Dutch residency. It embraces the Riau (Riouw), Lingga, Tambelan, Natuna, and other groups of islands. The chief island of the Riau group is Bintang or Riouw, adjacent to which on an islet is Rio (Rouw), the chief town of the residency. Trepan, tin, and pepper are exported. Its area is 16,301 sq. m. Pop. 200,000.

Rib. In the human being, one of a series of paired, curved bones. They are twelve in num-



Rib. Diagram indicating relative portions of true and false ribs

ber on either side of the body, and in either sex. Posteriorly, the ribs articulate with the spinal column. Their anterior ends terminate in cartilaginous prolongations, the costal cartilages. The first seven pairs of ribs articulate with the sternum or breast-bone. The cartilages of the next three are attached to the cartilage of the rib above each. The extremities of the last two ribs are entirely free, and for this reason they are sometimes termed "floating ribs." At the posterior end is a thickened part known as the head. Along the lower margin of each rib runs a groove which contains a nerve and blood-vessels.

Fracture of a rib may be produced by direct violence such as a blow, and in that case the bone breaks inwards, and serious injuries to the pleura, lungs, or liver may result. Indirect violence, such as the passage of a cartwheel over the body, tends to cause fracture at the point of maximum curvature, the fractured ends being directed outwards. Indirect fractures are treated by strapping the affected side of the body with

strips of adhesive plaster, so as to limit as far as possible movements of the bone. Strapping of a direct fracture is, however, undesirable, as it tends to drive the broken ends farther inwards.

A cervical rib is an additional rib, usually present on each side, and arising most frequently from the 7th cervical vertebra. It may be free or may unite with the first rib. In early life this deformity may produce no symptoms, but as the bone grows it is likely to interfere with the arteries and nerves in the neighbourhood, producing neuralgia, paralysis, and possibly gangrene of the fingers from interference with the circulation. When these symptoms make their appearance, the growth should be removed by a surgical operation. See *Anatomy*; *Man*.

Rib. In aeronautics, that part of an aeroplane which serves to maintain the designed profile or cross section of the wings and other surfaces, and to transmit the air pressure on the fabric covering to the main spars of the surfaces. The ribs of an aeroplane wing are light wooden or metal structures, spaced along the span of the wings at intervals of 6-18 ins., running fore and aft from the leading edge to the trailing edge of the wings, and firmly attached to the main spars.

R.I.B.A. Abbrev. for Royal Institute of British Architects. See *Architect*.

Ribalta, FRANCISCO (1551-1628). Spanish painter. Born at Castellon de la Plana, he studied in Valencia, and for three years in Italy. His best works are to be found in the churches and museums of Valencia; one may cite especially his great altar-piece, *The Last Supper*, in the College of Corpus Christi. His Christ borne by two Angels is in the Prado, Madrid.

Ribble. River of England. It rises on the E. of Wharfedale and flows through Yorkshire S. and S.W., and forms the boundary of that county with Lancashire for about 6 m. It then resumes a S.W. course through Lancashire to the Irish Sea, which it enters by an estuary having a maximum breadth of 6 m. Preston is situated on its right bank, near the head of the estuary. Its length is 75 m. See *Lytham*; *Preston*.

Ribblesdale, BARON. British title borne by the family of Lister since 1797. The first baron was Thomas Lister, M.P., a wealthy Lancashire manufacturer, and in 1876 his descendant, Thomas, became the fourth baron. A distinguished figure in society, he was master of the royal buckhounds 1892-95, and was known as a



4th Baron Ribblesdale,
British peer
Russell

master of fox-hounds. He married a daughter of Sir Charles Tennant. She died in 1911, and he married Mrs. J. J. Astor in 1919. His family seat is Gisburne Park, Clitheroe, Lancashire.

Ribbon. Word used in a military sense for the specially coloured ribbons from which medals are suspended. To avoid the inconvenience of wearing the medals constantly, a piece of its proper ribbon, $\frac{3}{8}$ in. deep, is worn on the left breast, and where more than one ribbon is used, they are placed side by side, descending in order of precedence from the right of the wearer. *See* Medals, colour plate.

Ribbon and Ribbon Making. (Fr. *ruban*, from Old French *riban*, *ruband*, a word of doubtful origin). A narrow woven strip in a textile fabric, usually silk. Also part of the insignia of a knightly order. In industrial machinery, a narrow strip or band of any material. Ribbons play an important part in the haberdashery and millinery trades, and the manufacture of ribbons made enormous headway in the principal centres of the silk trade during the latter half of the 19th century. Power looms are now used in making nearly all ribbons, though a certain amount of fine artistic work is still executed on hand looms.

The chief centre of the industry in Great Britain is Coventry, which owed its prosperity in the mid-nineteenth century largely to the ribbon industry. The industry was introduced at the end of the 17th century or the beginning of the 18th by a Mr. Bird when ribbons were a fashionable craze. Protestant French workmen expelled from France were at first employed. The prohibition of French imports of ribbon in 1765 is said to have led to a lowering of the standard of quality. In 1818 about 10,000 persons in Coventry were engaged in the ribbon trade, which was also carried on in neighbouring towns and villages, and in 1860 the number had risen to 25,000, much of the work being done in "cottage" factories. The Anglo-French commercial treaty of 1860 seriously affected the trade, which then had to compete with the artistic products of Lyons and St. Etienne and the products of Moscow and Basel.

but it revived in the 'seventies owing to improved standard of quality. Another important centre of the ribbon industry is Paterson, New Jersey.

The census of production taken in 1907 showed the value of the ribbons manufactured at £121,000 a year, but probably the value was really greater, as a certain amount would be returned as trimmings. The number of ribbon and "small ware" looms was 703. *See* Silk.

Ribbon Fish. Popular name given to various deep-sea fishes which have the body elongated and laterally compressed so as to resemble a ribbon. The back fin runs the whole length of the body, and in some species it is developed above the head into a series of long rays. In the case of one form, the ventral fins consist of single rays tipped with a red tag, which is said to be used as a bait to attract the small fishes on which the animal feeds. Some of these ribbon fish attain a length of 20 ft., with a depth of a foot, and a thickness of little more than an inch. *See* Oar Fish.

Ribbon Grass (*Phalaris arundinacea*). Stout, tall grass of the natural order Gramineae. A native of the N. temperate regions, the cultivated variety *variegata* has broad, flat leaves striped with yellow. It has a creeping rootstock, and stout, erect stems 6 ft. high, ending in a loose plume of flowers tinged with purple. The wild form grows on British river-banks and the margins of lakes,



Ribbon Grass.
Plume of flowers

and is known as Reed-grass.

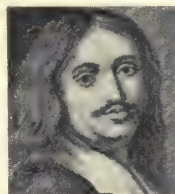
Ribbonmen. Term used for the members of the Ribbon Society. This was an Irish secret society founded about 1820, and so called from the green ribbon worn by members in their buttonholes. It was composed of small farmers, agricultural labourers, small shopkeepers and artisans of the Roman Catholic faith, and its purpose and policy varied according to district. In Ulster it was primarily a league against the Orangemen; in other provinces it was an organization against rack renting and other agrarian grievances, while in the town it approximated to trade-

unionism. After being proscribed as an illegal body by an Act of 1871, the Ribbon Society died out.

Ribchester. Village of Lancashire, England. It stands on the Ribble, 5 m. from Blackburn. It is notable as the site of a Roman station, Bremetennacum, which was garrisoned for 300 years by auxiliary troops. They included Polish Sarmatians, attested by an altar inscription and a gold-studded leather-covered ox-skull, now lost. A bronze helmet and sepulchral slab portray cavalry. Pop. 1,300.

Ribécourt. Village of France. In the dept. of Nord, it is on the Oise, 7 m. S.W. of Cambrai. Captured by the British 6th div., Nov. 20, 1917, it was recaptured by the Germans in March, 1918, but recovered Sept. 27, 1918. *See* Cambrai, Battles of.

Ribera, JUSEPE OR JOSÉ DE (1588-1656). Spanish painter, called Lo Spagnoletto. Born at



Josepe de Ribera,
Spanish painter

San Felipe, Jan. 12, 1588, he studied under Francisco Ribalta at Valencia, and Caravaggio at Rome. Becoming prominent among the Naturalistic painters, he worked successfully at Rome, Parma, and Naples. *See* Jerome, S.

Ribesiaceae OR CURRANT FAMILY. Natural order of shrubs. Natives of Europe, temperate Asia, and N. America, they have alternate, lobed leaves. The flowers consist of a more or less bell-shaped calyx, to which the minute petals are attached. The fruit is a pulpy berry containing numerous seeds. A few, like the American species *Ribes sanguineum* and *R. speciosum*, have showy flowers and are grown in gardens for effect, but others, with greenish flowers, are cultivated for their juicy, acid fruits. *See* Currant; Gooseberry.

Ribot, ALEXANDRE FÉLIX JOSEPH (1842-1923). French statesman. He was born at St. Omer, Feb. 7, 1842, and was educated in Paris, graduating in law at the Sorbonne. By profession an advocate, he turned his attention to politics, and was elected a member of the Chamber of Deputies in 1878. He was minister for foreign affairs, 1890-92, and president of



Alexandre Ribot,
French statesman

the council, or prime minister, 1892-93, being also minister of the interior. In 1895 he was again president of the council, combining the position with that of minister of finance. In June, 1914, he was for the third time prime minister, but only for a couple of days. After the outbreak of the Great War he was minister of finance, 1915, and prime minister once more, March-Sept., 1917, becoming thereafter minister for foreign affairs till the fall of the cabinet of Painlevé in Nov., 1917. He was a member of the French Academy. He wrote a *Life of Lord Erskine*, 1866, and died, Jan. 13, 1923.

Ribot, THÉODOLE ARMAND (1839-1916). French psychologist. Born Dec. 13, 1839, he became a teacher, and was for some years engaged in that calling. In 1876 he founded *The Philosophical Review*, and in 1885 began to lecture on psychology. In 1888 he was made professor of psychology at the Collège de France. Ribot defines psychology as the science of facts which appear under two inseparable aspects—the internal or conscious, and the physiological. Introspection, the examination of our own thoughts and feelings, being individual and limited, needs to be supplemented by external observation. He is the author of important works on English and German psychology; *Diseases of the Will, Memory, and Personality*; *The Psychology of Attention and the Emotions*, etc. Many of his books have been translated into English. He died Dec. 9, 1916.

Ribston Hall. Mansion in Yorkshire (W.R.), England. It is on the Nidd, $3\frac{1}{2}$ m. from Knaresborough. Early in the 13th century it belonged to the Knights Templars, who held it until 1311, when the property passed to the crown. In 1324 it was handed over to the Knights Hospitallers of S. John of Jerusalem, who held it until the Reformation. Later it came into the hands of the Goodricke family, who rebuilt it in 1674. In its gardens, in 1709, the first Ribston pippin was planted by Sir Henry Goodricke, who introduced it from Normandy.

R.I.C. Abbrev. for Royal Irish Constabulary (*q.v.*).

Ricardo, DAVID (1772-1823). British political economist. Born in London of Jewish family. April 19, 1772, he made a large fortune on the stock exchange, and took a keen interest in economic and scientific questions. In 1809 appeared his letters to *The Morning Chronicle* on depreciation of currency. Other works followed in 1815-16, and in 1817 came his

chief work, *Principles of Political Economy and Taxation*. It is chiefly noted for his exposition of the theory of economic rent. Retired from business after 1814, Ricardo represented Portarlington in Parliament from 1819 onwards, and was an active spokesman of the Radical wing. He died at Gatcombe Park, Gloucestershire, Sept. 11, 1823. See *Political Economy*; *Rent*; consult also *Works*, with notice by J. R. McCulloch, 1888; David Ricardo, J. H. Hollander, 1910.

Ricasoli, BETTINO, BARON (1809-80). Italian statesman. Born at Broglio, Tuscany, March 19, 1809, and early left an orphan, he came into the family property and soon demonstrated patriotic sympathies. His paper, *La Patria*, was founded in 1847, and in the disturbances of the next year he was,



Baron Ricasoli,
Italian statesman

for a while, *gonfaloniere* of Florence. He continued to exercise considerable influence and was instrumental in bringing about the union of Tuscany and Piedmont, 1860. On the death of Cavour, 1861, Ricasoli became prime minister, and, by his friendly attitude towards Mazzini and his attempt to open relations with Pius IX, did his utmost to smooth the way for Italian progress. Resigning in 1862, he entered office again four years later and renewed his attempts to placate the Vatican. The nation was not, however, with him, and he was obliged to resign



David Ricardo, British
political economist
After T. Phillips

after a few months. He died Oct. 23, 1880.

Riccarton. Parish of Ayrshire, Scotland, now a suburb of Kilmarnock. It stands on the left bank of the Irvine, opposite Kilmarnock. Around are coal mines. The name is a corruption of Richardstown, called after Richard Wallace, brother of William Wallace, who lived near here. In 1638 it was made a burgh and it remained so until the parish was united with Kilmarnock (*q.v.*) in 1871.

Ricci, MATTEO (1552-1610). Jesuit missionary. Born at Macerata on Oct. 6, 1552, he studied law in Rome, but entered the Society of Jesus in 1571. He went to India, 1577, completing his studies at Goa, and, after some discouraging attempts, succeeded in obtaining a footing for missionary enterprise in



Matteo Ricci,
Jesuit missionary

China, 1583. Having worked at Chowkingfu, 1583-89, and at Chaochow, 1589-95, after many difficulties he penetrated to Peking, and in 1600 he obtained permission to establish himself in the capital. He published a valuable book of memoirs and information relative to Chinese history. Ricci died at Peking, May 11, 1610.

Rice (*Oryza sativa*). Grass of the natural order Gramineae, native of Asia and Australia. It is very variable under different conditions, being extensively cultivated in all countries where there are marshy lands and a temperature between 60° and 80° Fah., which is requisite for the ripening of the grain. Fifty or more varieties are known, of which about twenty have been described as species. The

flowers are produced in a somewhat pyramidal plume. Each fruit or grain of rice stands on a separate footstalk.

In average Burma rice the unhusked berry is composed of carbohydrates, 77 p.c.; proteins, 8 p.c.; fats, $1\frac{1}{2}$ p.c.; fibre, 1 p.c.; ash, 1 p.c.; moisture, $11\frac{1}{2}$ p.c. The protein element is almost wholly



Ribston Hall. Garden front of the Yorkshire mansion
By courtesy of Country Life, Ltd.



Rice. Coolies planting rice in the flooded fields on a Japanese plantation

deficient in gliadin, the form of gluten whose stickiness enables wheat-flour to be converted by fermentation into dough. Hence rice-flour cannot be used for bread-making. Rice food takes the form of boiled or baked unleavened grain, whole, broken, or ground. In temperate climates, including China, fatty and nitrogenous elements are habitually added.

The commercial preparation of rice demands complex mechanical processes. Threshed grain or paddy, after sifting and winnowing, yields clean paddy, which by hulling is separated into husked or cargo rice, and husk. Husked rice is separated by skinning into white rice, and meal or bran. Polishing of the white rice produces the form preferred by European populations. It may also be coated or glazed. The final yield is: polished, 44 p.c.; broken, 24 p.c.; dust, 3 p.c.; meal and polish, 9 p.c.; husk, 20 p.c.

Besides furnishing to the dietary of mankind a larger contribution than any other foodstuff, rice is used in the manufacture of starch, vinegar, and other commodities. In Japan it yields an alcoholic drink called saké, there being 20,000 breweries with an annual output of 150,000,000 gallons. Bran and polish are sold for cattle-food as rice meal. In Burma, the husk, forming one-fifth of the weight of the paddy crop, is used as fuel in specially designed furnaces, or is converted into producer gas.

The world production of cleaned rice, as estimated by the Imperial Institute in 1920, is:

British.—India, 35,079,000; Egypt, 366,000; other parts of the Empire, 378,000; total, 35,818,000 tons.

Non-British.—Japan, 8,177,000; Netherlands E. Indies, 4,244,000; French Indo-China, 3,500,000; Siam, 2,500,000; Korea, 1,758,000; Formosa, 647,000; rest of Asia, 981,000; Madagascar, 450,000; America, 957,000; Europe, 474,000; total, 23,688,000 tons.

China is excluded because reliable figures are lacking; its production is assumed to be almost equal to that of India. The bulk of the world's rice crop is consumed in the countries of production. The total exportable surplus for all countries is only 6,400,000 tons. See Plants, col. plate.

Rice, ALICE HEGAN (b. 1870). American novelist. Born at Shelbyville, Ky., her maiden name was



Alice Hegan Rice, American novelist

Hegan, and her husband, Cole Young Rice, wrote many poems and poetic dramas. She is best known as the author of the popular Mrs. Wiggs of the Cabbage Patch, 1901. She also wrote Lovey Mary, 1903; Sandy, 1905; Captain June, 1907; Mr. Opp, 1909; A Romance of Billy-Goat Hill, 1912; and Quin, 1921. Several of her stories were translated into German, French, etc., and Mrs. Wiggs proved a success in America and England in dramatised form.

Rice, EDMUND IGNATIUS (1762-1844). Irish philanthropist. Born near Callan, co. Kilkenny, he was for several years in business at Waterford. About 1796 he began to take an active interest in the poor of the town, and in 1802 opened a free day school for poor children. Other schools followed, and, with a few friends, he founded the religious order of the Christian Brothers (*q.v.*). The movement spread to England and Australia before his death at Waterford, Aug. 29, 1844.

Rice, JAMES (1843-82). British novelist. Born at Northampton, Sept. 26, 1843, and educated at Queens' College, Cambridge, he became a barrister, 1871, and took up journalism. In 1879 he published

a History of the British Turf, an eminently readable if not strictly historical work. His fame rests, however, on his collaboration in the writing of novels with Walter, afterwards Sir Walter, Besant, a partnership which began with Ready Money Mortiboy in 1872. Among other novels written in collaboration are This Son of Vulcan, 1876; The Golden Butterfly, 1876, the most successful of all; The Chaplain of the Fleet, 1881; and The Seamy Side, 1881. He died at Redhill, April 26, 1882.

Rice Bird. Popular name for the bobolink (*q.v.*). The name is also applied to the Java sparrow, commonly seen in aviaries.

Rice Flower (*Pimelea*). Genus of trees and shrubs of the natural order Thymelaeaceae, natives of



James Rice, British novelist



Rice Flower. Stalks of foliage and flowers of the Australasian shrub

Australasia. They have opposite or scattered leaves, and tubular flowers, mostly in clusters or dense heads, at the tips of the annual shoots. They are largely cultivated as greenhouse plants, the best known being *Pimelea spectabilis* with white flowers in dense globular heads, surrounded by bracts with coloured margins. *Pimelea ferruginea* has similar heads of rosy flowers.

Rice Paper. Thin, delicate paper used by Eastern artists. It is made from the pith of *Fatsia papyrifera*, which grows wild in Formosa, also from an aesclyne of China. Good artificial flowers are made from the paper. The Japanese also make a paper from rice straw. See Paper.

Rice-paper Plant (*Fatsia papyrifera*). Shrub of the natural order Araliaceae. A native of Formosa, it grows to a height of about 8 ft., and has large, lobed, downy leaves

and drooping clusters of greenish flowers. The thick cylinder of white pith from the stems is rotated against the edge of a long knife, which shaves it into an even sheet to form rice paper (*q.v.*).

Ricercare (Ital., to search out). Seventeenth century name for a piece of music wherein the inherent possibilities of the theme in the way of ingenious and learned device were exploited to the full.

Rich. English titled family. It was founded by Richard, 1st Baron Rich (c. 1496–1567), of Leez or Lees, now Leighs, Essex, whose grandson, Robert (d. 1619), was 1st earl of Warwick of the 1618 creation. Of Robert's two sons, Robert (1587–1658), the 2nd earl, was for a time lord high admiral, while his second son, Henry (1590–1649), knighted 1610 and created Baron Kensington, 1623, and earl of Holland, 1624, was beheaded, March 9, 1649. Charles (d. 1673), 2nd son of the 2nd earl, married Mary (1625–78), daughter of Richard Boyle, 1st earl of Cork, and became 4th earl of Warwick. Robert (d. 1658), the only son of the 3rd earl, Charles's elder brother, Robert (d. 1659), married Frances Cromwell, 4th and youngest daughter of the Protector. Robert, the 5th earl of Warwick, and the last Rich of Lees, was son of Henry, earl of Holland. *See* Warwick, Earls of; consult also Mary Rich, Countess of Warwick, Her Family and Friends, C. F. Smith, 1901.

Rich, CHRISTOPHER (d. 1714). English theatrical manager. At one time Drury Lane, the Dorset Theatre, and The Haymarket, in London, were under his control. His son John (c. 1682–1761) in 1714 opened the theatre in Lincoln's Inn, and founded the Beef-steak Society. He died Nov. 26, 1761.

Rich, CLAUDIUS JAMES (1787–1821). British Orientalist and traveller. Born at Dijon, March 28, 1787, and educated at Bristol, he entered the service of the East India Company, whose resident he was at Bagdad. He died of cholera, at Shiraz, Oct. 5, 1821. His Oriental collections were acquired by the British Museum.

Rich, PENELOPE DEVEREUX, LADY (c. 1562–1607). Daughter of Walter Devereux, 1st earl of Essex, her mother was a daughter of Sir Francis Knowles and cousin of Queen Elizabeth. It was the earl's last wish that she should marry Sir Philip Sidney. In 1581, however, she married Robert, 3rd Baron Rich, who in 1618 became 1st earl of Warwick. The Stella of Sidney's sonnet sequence, Astrophel and Stella, after Sidney's death she



Rice-paper Plant. Head of leaves and, inset, flower spray

lived with Charles Blount, 8th Baron Mountjoy, who was created earl of Devonshire in 1603 and



Penelope Lady Rich

From a supposed portrait in Lambeth Palace

married her in 1605 after her husband had divorced her. Her brother Robert, 2nd earl of Essex, married Sir Philip Sidney's widow. Florio's translation of Montaigne was dedicated to her. *See* Sir P. Sidney's Astrophel and Stella, A. W. Pollard, 1888; Penelope Rich and Her Circle, M. S. Rawson, 1911.

Rich, SIR RICHARD RICHE, 1ST BARON (c. 1496–1567). English statesman. After study at the Middle Temple, he became M.P. for Colchester, 1529, solicitor-general, 1533, was knighted in 1533, and appointed speaker, 1536. Raised to the peerage as Baron Rich of Leez, Essex, in 1546, he was lord chancellor, 1548–51, amassed wealth from monastic spoils, built, at Little Leighs, a mansion of which the fine gateway and a few other remains exist, and in 1564 founded Felsted grammar school. He died at Rochford, June 12, 1567, and was buried at Felsted. *See* Felsted School; consult also History of Felsted School, J. Sargeant.

Rich, SIR ROBERT (1685–1768). English soldier. Born July 3, 1685, second son of Sir Robert Rich, 3rd bart., he served under Marlborough, fought at Dettingen, and secured the baton of field-marshal in 1757. He was M.P. for Dunwich, 1715–22, Beeralston, 1724, and St. Ives, 1727–41. His son Robert (1714–85), 5th bart., was also a soldier. On his death at Bath, May 19, 1785, the title expired.

Richard. Masculine Christian name. Of Teutonic origin, it means stern or hard in ruling. It has long been popular in England and

France, and in the form Richard was used by the Anglo-Saxons before the Norman Conquest.

Richard I (1157–99). King of England. The third son of Henry II, he was born Sept. 8,

1157, and became popularly known as Coeur de Lion, the Lion Heart. In 1170 he was given the dukedom of Aquitaine by his father. He and his equally turbulent brothers, Henry and Geoffrey, quarrelled ceaselessly with each other and with their father; in 1189, Richard was again at war with his father, when the old king died and Richard himself became king of England. He threw himself with ardour into the crusade which was being organized, and passed only six months of his reign in England.

The dissensions and jealousies among the crusading princes and nobles were intensified when Richard joined them in Palestine at Acre in June, 1191, though the capture of the fortress, in July, was mainly due to him. Richard made half the princes permanently his enemies; in spite of brilliant feats of arms, Richard found the conquest of Palestine was impossible, and in Sept., 1192, made a three years' truce with Saladin.

On his way home, in order to avoid passing through France, he tried, in the guise of a simple knight, to slip through the territory of his enemy, Leopold, duke of Austria. But he was discovered, captured, and handed over to the emperor, Henry VI, who held him a prisoner. In spite of the machinations of his brother John, he was released on the payment of a huge ransom and returned to England in March, 1194. He magnanimously forgave John, but almost immediately left England once more in charge of the justiciar, Hubert Walter, while he betook himself to Aquitaine, and sought to form a great coalition against the French king. In the midst of his larger schemes, however, he was stirred to anger against a refractory vassal whom he attacked, and was mortally wounded while besieging the castle of Chaluz, April 6, 1199. *See* Armour; Berengaria; Crusades; consult also England under the Angevin Kings, K. Norgate, 1887; The Crusade of Richard I, T. A. Archer, 1888; The Angevin Empire, J. H. Ramsay, 1903.



Richard I, King of England

Richard II (1367-1400). King of England. The younger son of Edward the Black Prince, he was

born Jan. 6, 1367, and succeeded his grandfather, Edward III, as king of England, June 21, 1377. During his boyhood the government of the country was



Richard II,
King of England

mainly in the hands of his uncles. In 1381 occurred the rising of the peasantry commonly called Wat Tyler's revolt. When all the authorities appear to have been panic-stricken, the boy king displayed a courage and presence of mind which saved a critical situation.

As Richard grew older he sought to shake off the yoke of his uncles, but his chosen counsellors and favourites were "appealed" of treason. Richard found himself obliged to submit, but in May, 1389, a successful *coup d'état* removed the controlling nobles from his council, and for eight years the king ruled with moderation and wisdom. It would seem, however, that he had been only nursing his revenge. Suddenly, in 1397, the group of nobles against whom his resentment was hottest were arrested for treason, and were executed, put to death in prison, or banished. There remained two nobles whom Richard suspected, Henry of Hereford and Mowbray, duke of Norfolk. In Sept., 1398, both were banished. A cowed parliament had already bestowed upon Richard despotic powers which he now exercised arbitrarily. When John of Gaunt died he seized the inheritance of Lancaster, which should have passed to Henry of Hereford.

Then when Richard, in 1399, had gone to Ireland, Henry returned to England to claim his inheritance, and to reform the government. Richard suddenly found himself deserted, was taken prisoner by Henry, carried to London, and compelled to abdicate, Sept. 29, whereupon Parliament declared Henry to be lawful king of England by right of descent. Richard was imprisoned in Pontefract Castle, where he died or was murdered, Feb. 14, 1400. See Appellants; Henry IV; Peasants' Revolt; Pontefract; consult also England under Richard II, De L. O'Leary, 1908; The Reigns of Edward II, Edward III, and Richard II, 2 vols., Sir J. H. Ramsay, 1913.

Richard III (1452-85). King of England. The youngest brother of Edward IV, he was born Oct. 2,

1452, and usurped the throne of England, setting aside the lawful king, his nephew Edward V, June 26, 1483. Apart from traditions for which his enemies are responsible, his record until his brother's death had been that of a very able soldier whose loyalty had never swerved. Yet by a series of absolutely unscrupulous actions between April 9 (when Edward IV died) and June 26, he struck down one after another of the men who were likely to stand in the way of his ambitions, and seized the crown.

Edward and his brother were imprisoned in the Tower. Richard started on a royal progress through the country, and the two princes disappeared. The throne won by



Richard III,
King of England

crime could only be retained by terrorism, and Richard instituted a reign of terror. The atmosphere became thick with conspiracies. The hopes of plotters centred upon the young earl of Richmond, Henry Tudor. Buckingham, who had helped Richard to his crown, raised a rebellion in Nov., 1483, but it collapsed, and Buckingham was executed. On Aug. 7, 1485, Richmond landed at Milford Haven, and on the 22nd Richard, deserted at the critical moment by professed supporters, was slain at the battle of Bosworth. See History of Richard III, Sir T. More, 1833; History of Richard III, J. Gairdner, 2nd ed. 1898; Richard III, his Life and Character, Sir C. R. Markham, 1906.

Richard (1209-72). King of the Romans, known as Richard of Cornwall. Born at Winchester, Jan. 5, 1209, the second son of King John of England, he was made earl of Cornwall in 1225, and, after quarrelling with his brother, Henry III, led a crusade to the Holy Land in 1240. Declining the crown of Sicily in 1252, five years later he was elected king of the Romans. Reconciled to Henry, he fought for him in the Barons' War, and was taken prisoner at the battle of Lewes, 1264. Liberated after the battle of Evesham, he died April 2, 1272.

Richard, François Marie Benjamin (1819-1908). French prelate. Born of the noble family of Laverne at Nantes, he was educated for the priesthood at St. Sulpice, Paris, was vicar-general of Nantes, 1850-70, and bishop of Belley, 1871. In 1875 he became coadjutor to the archbishop of

Paris, whom he succeeded in 1886, becoming cardinal, 1889. He was a staunch defender of Church rights against the State. He published several books, including *La Vie de la Bienheureuse Françoise d'Amboise*, 1865. He died Jan. 29, 1908.



François Richard,
French prelate

Richards, Sir Frederick William (1833-1912). British sailor. Born Nov. 30, 1833, he entered the navy in 1848, reaching the rank of commander, 1860. He was junior lord of the Admiralty in 1882-85, and First Sea Lord from 1893 to 1899. He had previously served in the Zulu and Boer Wars, 1879-81, and commanded the naval forces in the Burma Annexation War, 1885-86. He died Sept. 28, 1912.

Richards, John Morgan (1841-1918). American business man. Born at Aurora, New York, Feb. 16, 1841, he was the son of Rev. J. Richards, D.D., a Presbyterian minister, and belonged to a family that emigrated to America early in the 18th century. He entered business life, and in 1867 settled in London, where he was the head of the firm of J. M. Richards and Sons. Largely responsible for making the cigarette popular in Great Britain, he was known as a pioneer of advertising. He wrote *With John Bull and Jonathan*, 1905, and *Almost Fairland*, 1914; and edited the *Life and Letters of his daughter, John Oliver Hobbes*, 1911. From 1888-1905 he was the proprietor of *The Academy*. Richards died Aug. 10, 1918.

Richardson, Sir Benjamin Ward (1828-96). British physician. Born at Somerby, Leicestershire, Oct. 31,



Sir B. W. Richardson,
British physician

1828, and educated at Glasgow, he came to London, 1853, and was appointed physician to a number of London hospitals. He wrote widely, associating himself chiefly with sanitary reform, founding the *Journal of Public Health and Sanitary Review*, 1855, and wrote *Hygienic treatment of pulmonary consumption*, 1857; *Cause of the coagulation of the blood*, 1858; *Medical history and treatment of teeth*, 1860, etc. He died Nov. 21, 1896.

Richardson, SAMUEL (1689–1761). English novelist. Born in Derbyshire, he came to London at the age of seventeen, and was apprenticed to the printing trade, becoming by his industry a prosperous master printer, with the official appointment of printer of the journals of the House of Commons. All his life Richardson displayed a partiality for ladies' society, and this predilection is reflected in his novels. His genius, however, matured late; it was not until he was over fifty that he turned his mind to novel writing. His first, *Pamela (q.v.)*, or *Virtue Rewarded*, 1740, was cast in the form of letters—as, indeed, were all his novels. Pamela was followed by *Clarissa Harlowe (q.v.)*, 1748. In his third novel, *Sir Charles Grandison*, 1754, Richardson attempted to delineate a virtuous man. The result is a failure. Few have excelled Richardson in knowledge of feminine psychology; he was much less at home in dealing with the sterner sex. Though often prolix to an unconscionable degree, and lacking in the sense of relevance, Richardson represents a notable landmark in the evolution of the novel. Richardson died July 4, 1761. *See English Literature*; Fielding, H.; *Novel*; Salisbury Square; consult also *Correspondence*, 6 vols., ed. A. L. Barbauld, 1804; *Lives*, C. L. Thomson, 1900; H. Austin Dobson, 1902.

Richardson, THOMAS (1870–1912). English professional cricketer. Born at Byfleet, Surrey,



T. Richardson,
English cricketer

Aug. 11, 1870, he first played for his county against Essex at Kennington Oval in 1892. One of the fastest bowlers the game has produced, he recorded many notable performances. He took part in four test matches in England against the Australians, one in 1893 and three in 1896, and toured with English teams in Australia, his bowling analysis for these games being 88 wickets for an average of 25.22 runs. He died July 3, 1912.

Richborough. British seaport. It stands on the estuary of the Stour between Sandwich and Ramsgate. After the outbreak of the Great War, congestion at the ports necessitated the provision of greater transport facilities between England and France, and the stretch of coast in the vicinity of the ruins of Richborough Castle was selected as the site of a new one. Work was commenced in April,

1916, and carried on continuously during the war until the works covered an area of 2,200 acres.

The diversion of the river Stour, known as the New Cut, provides a basin or dock. Near the end of the wharf, at the mouth of the river, is the terminus of the cross-Channel goods train ferry. A number of slips are provided for the construction of steel barges.

Cross-Channel traffic commenced in Dec., 1916, and in the following two years the transport of war materials amounted to 1,250,000 tons, while 157,000 tons of war salvage were imported. This included 18,000 guns, carriages and



S. Richardson

After J. Highmore

limbers. In addition, the train ferry dealt with enormous quantities of materials and wheeled vehicles. This new port bids fair to retain its position of importance in future trade between Great Britain and the Continent. In 1921 it was purchased by the Port of Queenborough Development Company.

Richborough was the Roman *Rutupiae*, the principal port of entrance to Britain. The ruins of the castle the Romans built include a wall, 460 ft. long and 32 ft. high, in the centre of which is S. Augustine's Cross, a mass of stonework and rubble possibly created to support a lighthouse. *See Channel Ferry*; consult also *The Romance of Richborough*, L. Shandel, preface by Viscount Northcliffe, 1921.

Riche OR **RICH**, **BARNABE** (c. 1540–1617). English soldier and romance writer. Of his 20 or 30 works, modelled more or less on Lyly's *Euphues* and borrowed

from Bandello and other Italian novelists, *Riche*, His Farewell to the Militarie Profession, 1581, contained the story of Apollonius and Silla, from which Shakespeare derived the plot of *Twelfth Night*.

Richembourg-L'Avoué. Village of France, in the dept. of Pas-de-Calais. It is 7½ m. N.E. of Béthune. Prominent in the earlier fighting in the Great War, it and the adjoining village of Richembourg St. Vaast were the scene of an attack by the British 1st div. on May 9, 1915. *See Festubert, Battle of.*

Richelieu. River of Canada. It issues from Lake Champlain, and, flowing N. for about 80 m., falls into Lake St. Peter, an expansion of the St. Lawrence, at Sorel. It is part of the waterway between the St. Lawrence and the Hudson rivers, and is navigable for large vessels. The river is also known as the Chambly and the St. John.

Richelieu, ARMAND JEAN DUFLEISSIS, CARDINAL, DUC DE (1585–1642). French statesman. Born Sept. 5, 1585, he entered the Church, found political employment, and was the real director of French policy almost throughout the reign of Louis XIII. His policy was that which had been inaugurated by Henry IV, of which the three leading features were the aggrandisement of France, the concentration of power in the hands of the monarch and his chosen ministers, and religious toleration. The crown had to contend with the efforts of the nobility, largely Huguenot, to recover the political ascendancy of which Henry IV had sought to deprive them; hence there was a prolonged struggle which had the appearance of a contest between Roman Catholicism and the reformed religion. Richelieu triumphed, but used his triumph as a victory for toleration as concerned the Huguenot religion, and a victory for the crown as concerned the nobility.

Owing to the struggle with which he was perpetually occupied until the end of 1630, Richelieu was prevented from taking the active part which he desired in the earlier stages of the Thirty Years' War (*q.v.*). Nevertheless his diplomacy had much to do with the intervention of Gustavus Adolphus in 1630, and after 1635 he himself intervened vigorously, though always with the sole purpose of aggrandising France. Even to the end, however, Richelieu had to defend himself perpetually against the intrigues of the nobles, which he invariably succeeded in crushing with the loyal support of the king. He died Dec. 4, 1642. When he died all France enjoyed complete liberty

of conscience, the crown was supreme, and France had established her position as the first military power in Europe. See *Mémoires*, 4 vols., pub. sous la direction de M. le Baron de Courcel, 1907-20: *Histoire de Cardinal Richelieu*, G. Hanotaux, 1893; *Lives*, R. Lodge, 1896; J. B. Perkins, 1900.

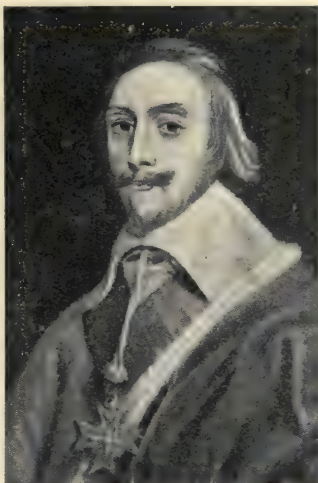
Richepin, JEAN (b. 1846 French poet, dramatist, and novelist. He was born at Médéa,



Algiers, Feb. 4, 1849, fought as a franc-tireur in the war of 1870, and led a roving life before turning to literature. As a poet he has

after P. de Champaigne

been summed up as "frankly, boldly, and insolently a romantic"; in many of his stories he is a realist, while in his earlier writing he dis-



After P. de Champaigne

S. by Petersham. It is famous for its associations with royalty and as the home of many poets, writers, and painters, Chaucer, Bacon, Sir W. Temple, Thom-



played a brutal coarseness which, in the case of *Chansons des Gueux*, 1876, led to his being fined and imprisoned for an outrage against manners. His many novels include *Les Morts Bizarres*, 1876; *Le Pavé*, 1883; *La Miseloque*, 1893; *Contes Espagnols*, 1901; *L'Aile*, 1911. Among his plays are *Nana Sahib*, 1883; *Le Filibustier*, 1888; *Par le Glaive*, 1892; *Vers la Joie*, 1894; *Les Truands*, 1899; *Don Quichotte*, 1905; *La Route d'émeraude*, 1909.

Richmond. Mun. bor. and residential suburb of Greater London. It is on the slope of a hill, in the co. of Surrey, 9 m. from Hyde Park Corner, is served by the L. & S.W., N. London, and District Rlys., is connected with the Piccadilly Tube at Hammersmith, and has excellent tramway and omnibus services. In 1921 it was proposed to connect it with the Central London Tube at Shepherd's Bush. The borough, which includes Kew, Petersham, and part of Mortlake, was incorporated in 1890, and is bordered N. by Kew Gardens, W. by the Thames, E. by Mortlake, and

son, Pope, Swift and Stella, Sir Joshua Reynolds, J. M. W. Turner, and George Eliot among the number. Its pop. has grown from about 15,000 in 1876 to 36,000 in 1921.

Originally known as West Sheen (A.S. *schene*, shining) and once a hamlet of Kingston, it owes its present name to Henry VII, and has been a royal manor since 1320. The manor house was converted into a palace by Edward III. Destroyed by fire in 1499, the palace was rebuilt by Henry VII. Elizabeth, once a prisoner here, died in the palace, which was dismantled in the 18th century. The remains of the palace were restored, 1913-19. The Old Deer Park is now the venue of the Richmond Horse Show, football, golf, hockey, and other sports. The observatory, 1768, is used for meteorological work. Near to it was a Carthusian priory founded by Henry V. Edmund Kean was lessee of a theatre which stood near to the Green. Maid of Honour Row was built for the ladies of Caroline's



Richmond, Surrey, arms



Richmond, Surrey. View from the Terrace Gardens, looking up the Thames. Top, left, entrance to the Old Palace

Valentino



court. The local Maid of Honour cakes are a kind of cheese cake made here since 1823.

The terrace gardens, public since 1886, command a magnificent view over the river. Near to them stood the famous Star and Garter hotel, founded in 1738 and pulled down in 1919 to make room for a home for disabled soldiers and sailors. Among the public buildings is the town hall, opened July 6, 1893. The parish church of S. Mary Magdalen, frequently altered, has some interesting monuments and a massive stone tower. The poet Thomson was buried in the churchyard. A five-arched stone bridge (1774-77) connects with Twickenham. A new bridge was projected in Oct., 1921. The heroine of the old ballad, The Lass of Richmond Hill, was Fanny P'Anson of Richmond Hill, Yorkshire. See Ham; Kew; Petersham; Sheen; consult also Handbook to the Environs of London, J. Thorne, 1876; History and Antiquities of Richmond, Kew, Petersham, Ham, etc., E. B. Chancellor, 1894; Gentleman's Magazine, March, 1904; Royal Manor of Richmond, A. G. Bell, 1907.

Richmond. Mun. borough and market town of Yorkshire (N.R.). It stands on the left bank of the



Richmond arms

Swale, 50 m. from York, with a station on the N.E. Rly. The chief object of interest is the ruined castle, standing on a hill above the river. The magnificent keep and some other portions remain. The chief church is S. Mary's, which, like Holy Trinity, has been largely restored. The tower remains of a monastery of the Greyfriars. Modern buildings include the town hall and market hall. The grammar school is also modern, although the foundation dates from the 16th century. Richmond has an agricultural trade and some small manufactures. Races are held here. Near the town are

the beautiful ruins of Easby Abbey.

Richmond was the head of a large honour, and from here various princes took the title of duke. The castle was built by the Normans,

motor vehicles, furniture, pianos, gloves, etc. Founded in 1816, Richmond was incorporated in 1818 and became a city in 1840. Pop. 26,800.

Richmond. Borough of New York City, U.S.A. It covers an area of 59 sq. m., and is co-terminous with Richmond co., the whole of Staten Island. It is largely a residential dist. It was constituted a borough Jan. 1, 1898. Pop. 116,500. See New York.

Richmond. City and port of entry of Virginia, U.S.A. The capital and largest city of the state, and the co. seat of Henrico co., it stands on the James river, 115 m. by rly. S. of Washington, and is served by the Southern and other rlys., and by ocean-going steamers. The Capitol, after the Maison Carrée at Nîmes, stands on Shockoe Hill, in



Richmond, Virginia. Monument to Robert E. Lee, the Confederate general. Top left, the White House of the Confederacy, residence of President Davis during the Civil War, now a Confederate museum

and the honour became crown property when Henry, earl of Richmond, became Henry VII. From 1584 to 1885 it was separately represented in Parliament. Pop. 4,000.

Richmond. City of Indiana, U.S.A., the co. seat of Wayne co. It stands on the Whitewater river, 70 m. E. of Indianapolis, on the Pittsburg, Cincinnati, Chicago and St. Louis, and other rlys. It is an agricultural centre, and has manufactures of agricultural machinery,

the centre of the city. Other buildings are the city hall, the chamber of commerce, the state library, and the splendid cathedral of the Sacred Heart. The city has several monuments, including one to Washington in the Capitol grounds. The Valentine Museum has a fine archaeological collection, and the state library contains upwards of 100,000 vols.

Richmond is a busy commercial and industrial city. It carries on an extensive trade in tobacco, one



Richmond, Yorkshire. Castle and bridge over the river Swale

Frith

of its chief manufactures, and has important ironworks, machine shops, and rly. plant works. It has flour mills and manufactories of wagons, carriages, lumber products, trunks, bags, and boxes. Founded in 1733, Richmond was incorporated in 1742 and became a city in 1782. It has been the state capital since 1779. For four years, 1861-65, Richmond was the headquarters of the Confederacy. Many battles were fought by the Federal forces for its possession, and on April 2, 1865, it was evacuated after the commercial quarters had been damaged by fire. Pop. 171,000.

Richmond. Suburb of Melbourne. It is a residential manufacturing district. Pop. 41,000. *See* Melbourne.

Richmond. Township of New South Wales. On the Hawkesbury river and 38 m. by rly. from Sydney, it is the centre of a grain and fruit growing dist. Pop. 1,700.

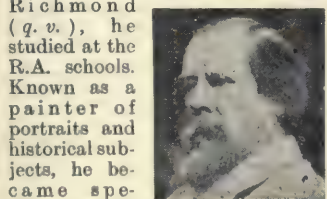
Richmond, GEORGE (1809-96). British painter. Born at Brompton, London, March 28, 1809, he studied under Fuseli at the R.A. schools. In his early career he was greatly influenced by William Blake. He became A.R.A. in 1857 and R.A. in 1867. His portraits included those of



Geo. Richmond
Self-portrait

William Wilberforce, then bishop of Oxford, 1868, the archbishop of Canterbury, 1880, and other eminent ecclesiastics; he also modelled a bust of Dr. Pusey, 1882. He died at Portman Square, London, March 19, 1896. The National Portrait Gallery possesses several of his works. *See* Dalhousie, Marquess of; Head, Sir E.; Keble, J.; Liddell, H. G.; Norton, 1st Baron; Palgrave, Sir F.

Richmond, SIR WILLIAM BLAKE (1843-1921). British painter. Born in London, son of George Richmond



Sir W. B. Richmond,
British painter
Russell

(*q. v.*), he studied at the R.A. schools. Known as a painter of portraits and historical subjects, he became especially prominent in the public mind in connexion with the decoration of the inner dome of S. Paul's with mosaics. He was Slade professor

at Oxford, 1878-83; became A.R.A. in 1888 and R.A. in 1895; and was created a knight in 1897. His minor activities included a vigorous and partially successful crusade against the smoke nuisance in London; and the direction and championship of the arts and crafts movement in Hammersmith. He travelled extensively in Italy and the East. He died Feb. 11, 1921. *See* Nightingale, Florence.

Richmond and Gordon, DUKE OF. Title held by the family of Gordon-Lennox. Charles Lennox,

natural son of Charles II by Louise de Kéroualle, was made duke of Richmond in the English peerage and duke of Lennox in the Scottish peerage in 1675. His son

Charles, 2nd duke, was lord high constable of England at the coronation of George II, inherited the French dukedom of Aubigny, 1734, and died 1750. Charles, 4th duke, was lord-lieutenant of Ireland,



7th Duke of Richmond and Gordon
Russell

1807-13, and governor-general of Canada from 1818-19. Charles, 5th duke, 1791-1860, assumed the additional surname of Gordon. He was succeeded by Charles Henry, 6th duke (*q. v.*), who received the U.K. dukedom of Gordon, 1876. His son, Charles Henry, 7th duke, was Conservative M.P. for Sussex, 1869-88. The seats of the dukes are at Goodwood, Sussex, and Gordon Castle, Fochabers, Banffshire. *See* Goodwood.

Richmond and Gordon, CHARLES HENRY, 6TH DUKE OF (1818-1903). British statesman.

Born in London, Feb. 27, 1818, he was educated at Westminster and Christ Church, Oxford, and entered the army in 1839. He became Conser-

vative member for W. Sussex in 1841, and sat till 1860, when he succeeded to the dukedom. He became president of the board of trade,



5th Duke of Richmond and Gordon
After E. Wilkins

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6th Duke of Richmond and Gordon,
British statesman

1867, and was leader of the Conservative party in the House of Lords, 1867-76. Lord president of the council, 1874-80, he was again at the board of trade and secretary for Scotland, 1885. He died at Fochabers, Sept. 27, 1903.

Richmond and Lennox, FRANCES TERESA STUART, DUCHESS OF (1648-1702). Mistress of Charles II. Born July 8, 1648, she was educated in France, and, coming to England as a maid of honour to Catherine of Braganza, soon won the king's heart by her beauty. Charles's favourite from 1663-67, she made a runaway match in the latter year with the duke of Richmond and Lennox, but returned to court in 1668. She remained at court during the reign of James II, and died Oct. 15, 1702. Her wax effigy, in the robes she wore at Anne's corona-



Frances Teresa, Duchess of Richmond and Lennox
After Sir Peter Lely

tion, is preserved in Westminster Abbey, where she was buried. Her beauty inspired artists and poets, and she was the model for the figure of Britannia on British copper coins. *See* Britannia.

Richmond Murder. Celebrated British crime. The murder was committed by Kate Webster, an Irish servant of an old lady named Mrs. Thomas, who lived at Richmond, Surrey. Webster killed her mistress with a meat chopper. Afterwards she dismembered the body and threw fragments into the Thames in a box, and the discovery of this box brought to light the crime. Crimes of dismemberment are rare in Great Britain, and the murder created an unusual sensation. Kate Webster was tried and executed in 1879.

Richmond Park. Royal demesne of 2,250 acres, in the co. of Surrey, England. It is bounded



Richmond Park. Plan of the royal deer park in Surrey

Based upon the Ordnance Survey map, with sanction of the Controller of H.M. Stationery Office

N. by Richmond, by Pesthouse, Sheen, and Palewell commons, and by Mortlake; S. by Kingston and Coombe; W. by Petersham and Ham commons and Sudbrook Park; E. by Kingston Hill, Kingston Vale, and Roehampton Vale. One of the most beautiful and popular parks near London, notable for its oaks, chestnuts, and birches, and undulating surface, it is stocked with red and fallow deer, and has two fine sheets of water, Pen Ponds, formed in the time of George II, and stocked with fish and water fowl. It contains White Lodge, the early home of Queen Mary and the birthplace of Edward, prince of Wales; Pembroke Lodge, Sheen Lodge, and the Thatched House Lodge. There is a public golf course, opened in 1923.

Once known as Sheene Chase, Richmond Park was enclosed in 1637 by Charles I, for hunting purposes. In 1649 the park was granted to the City of London, but it reverted to the crown at the Restoration. In 1758 the public right of footway between Richmond, Wimbledon, East Sheen, and Kingston was maintained in the law courts by a Richmond brewer named John Lewis. Of the rangers, the 2nd earl of Portland was the first, Sir Robert Walpole the fourth, and the 2nd duke of Cambridge the 12th. Many improvements were made later.

Richter, HANS (1843-1916). Austrian orchestral conductor. Born at Raab, Hungary, April 4, 1843, he became a successful orchestral horn-player and made the acquaintance of Wagner, who helped him to become chorus-master at the Munich opera, 1868. He conducted the first performance of Lohengrin at Brussels, 1870, and of The Ring of the Nibelungen at Baireuth, 1876, and accompanied Wagner to London in 1877. From 1875-97 he conducted chiefly in Vienna, but frequently in England as well, and from 1897-1911 was conductor of the Hallé Orchestra, Manchester. His strong personality and wide technical knowledge made him the greatest conductor of his day, and his friendship with Wagner made him an acknowledged authority on problems of Wagnerian production and interpretation. He died at Baireuth, Dec. 5, 1916.



Hans Richter,
Austrian conductor

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Richter, JOHANN PAUL FRIEDRICH (1763-1825). German author and humorist, often spoken of as Jean Paul. He was born March 21, 1763, at Wunsiedel, Bavaria. After studying theology

at Leipzig, he determined to turn to literature, but at first found writing easier than publishing. At the age of twenty his Grönlandische Prozesse (The Greenland Law Suit) was issued by a Berlin publisher, but was a failure. His second publication, Auswahl aus des Teufels Papieren (Extracts from the Devil's Papers), 1789, had little more success than the first, but in 1793, with his Die Unsichtbare Loge (The Invisible Opera Box), he won a first success; and Hesperus, 1795, made him famous.

Johann Paul Richter,
German author

Henceforth Richter was recognized as one of Germany's leading authors, and when he visited Weimar in 1796, and again in 1799, he was enthusiastically received. Other of his earlier works included Quintus Fixlein, 1796, translated into English by T. Carlyle in German Romance, 1827; Blumen, Frucht und Dornenstücke, 1796-97 (Flower, Fruit and Thorn Pieces), translated into English by A. Ewing, 1892; and Das Kampaner Thal (The Campanian Vale), a discussion on immortality, 1797.

In 1800 he visited Berlin, and there in the following year he married Caroline Meyer. In 1804 they settled at Baireuth. His later works included Titan, 1800-3, translated into English by C. T. Brooks, 1863, a romance which some critics, as did the author, regard as his greatest work; Flegeljahre (Wild Oats), 1804-5, new ed. 1901; Levana, oder Erziehungslehre für Töchter, 1807 (translated into English, Levana, or the Doctrine of Education for Girls, new ed. 1901); and Schmelzle's Reise, 1809 (Schmelzle's Journey, translated by T. Carlyle in German Romance, 1827). He died at Baireuth, Nov. 14, 1825. One of the greatest of German writers, his work was not without influence on Carlyle's style. Richter's works were first collected in 65 vols., 1826-38. See Life of Richter, E. Lee, 1842; Jean Paul, Sein Leben, Seine Werke, P. Nerlich, 1889; Humour and Humorists, P. Stapfer, 1911.

Richtthofen, BARON VON (1888-1918). German airman. Formerly in the cavalry, he joined the air force, and during the Great War became the most famous airman in the German service. He first came into prominence in Feb., 1917, when, as a lieutenant, he was



credited with 20 aerial victories. He commanded the 11th chasing squadron or "circus" with the rank of captain, and throughout 1917 increased his reputation as a pilot and fighting man. He claimed to have brought down the British airman, Major Hawker, V.C., while his brother, Baron von Richthofen, made a similar claim in the case of Captain Ball, V.C. He won his 80th victory in April, 1918, in which month he received the order of the Red Eagle with crown and swords. He was shot down behind the British lines near the Somme on April 21, 1918, and buried with full military honours. In his Memoirs, published in August, 1917, he made interesting references to British airmen, crediting them with skill and daring, and stating that Captain Ball was his most formidable foe.



Baron
von Richthofen,
German airman

Ricimer (d. A.D. 472). Roman general. Connected with the Visigothic royal family, he was brought up at Rome and soon attained high rank in the army. After defeating the Vandals by sea and land, in 456 he attacked the West Roman emperor Avitus, setting up Majorian in his place. From this time Ricimer, the Roman kingmaker, virtually ruled the empire for 16 years. In succession he installed upon the throne Libius Severus, 461; Anthemius, 467; and Olybrius, 472, in which year he died of the plague.

Rick. Compact structure into which hay is built up when carried. In Scotland and the N. of England and Ireland, hay is built up in the field into small summer or field ricks of a ton or less, which are subsequently carted away and built into large ricks. See Hay.

Rickets or **RACHITIS**. A disease of infants resulting from faulty diet and characterised by impairment of nutrition. Rickets occurs in all parts of the world, and is most prevalent among the poor children of large towns. Bad housing, overcrowding, insufficiency of food, and prolonged lactation are conditions conducive to the development of the disease, but the essential cause is the absence or insufficiency of certain important constituents in the food called vitamins.

The symptoms begin insidiously, and are generally noticed about the sixth to ninth month.

The child may have suffered from disturbance of digestion, and may have been irritable and restless. It shows a disinclination to walk, and is listless and peevish. There is a general soreness of the body, and the child cries when any attempt is made to move him. Slight fever, 100° to 101° F., is frequently present, and profuse sweating is a characteristic symptom.

As the disease progresses, changes in the bones become manifest. The ends of the bones are enlarged, and the bones do not possess the normal degree of firmness, nor do they grow at the natural rate. The legs become bent, the spine curved, the sternum or breastbone is thrown forward, and enlargement at the junction of the ribs with the costal cartilages produces a series of nodules down the front of the chest which is known as the "rickety rosary." The fontanelles or soft spaces between bones of the head remain open. The teeth often fail to erupt, or are decayed and imperfect. Some children become emaciated, while others remain well covered, but look pasty and flabby. Common complications of rickets are bronchial catarrh, pneumonia, bronchitis, and laryngismus stridulus. Enlargement of the lymphatic glands, disturbance of digestion, chronic diarrhoea, and other forms of ill-health are often associated with the disorder.

If the disease is not treated in the early stages death may occur from complications, or, when adult life is reached, there may be serious and permanent deformity. The most important consideration in the treatment of rickets is the feeding. Fresh cow's milk should be given, suitably diluted and in sufficient quantity according to the age of the child. Cod-liver oil is also helpful. Preparations of iron, phosphorus, and lime are recommended. Diarrhoea, if present, should receive the appropriate treatment. The child should be warmly clothed, given as much fresh air as possible, and should not be allowed to walk until the condition is improved. If curvature of the bones has already occurred, the defect can often be corrected by wearing suitable splints.

Rickets is also the term applied to a disease common in certain

breeds of dogs, notably bulldogs. It is caused by bad feeding, or a constitutional inability to deposit lime salts in the growing bones. The bones most affected are those of the foreleg, especially the radius, which become bent forward and much distorted. The hind limbs may also suffer. The worst cases are in dogs in which there has been in-breeding. See Dog.

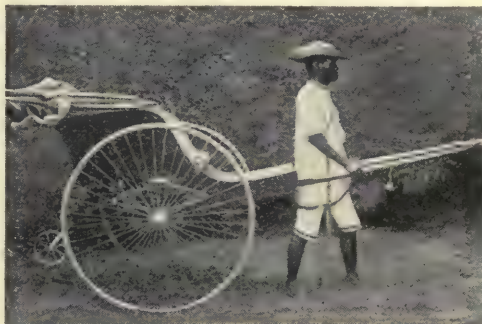
Rickmansworth. Urban dist. of Hertfordshire. It stands at the junction of the rivers Chess and Colne, 18 m. from London and 4 m. from Watford, and is served by the L. & N.W. and Metropolitan Rlys. and the Grand Junction Canal. S. Mary's is a modern church with some



Rickmansworth
urban district
seal

interesting internal features. Other buildings are the town hall and some 17th century almshouses. There are some small industries, chiefly brewing and printing, and the Colne is visited by anglers. Near is Moor Park (q.v.), which in 1920 Lord Ebury sold to Lord Leverhulme. Pop. 6,300.

Rickshaw or **JINRIKSHA** (Jap. jin, a man; riki, strength; sha, a car). Japanese vehicle, seating one person, and drawn by a man. It consists of a light chair mounted on two large wheels, and generally provided with a movable hood.



Rickshaw. The Japanese vehicle as used in South Africa

The coolie who draws it runs between shafts. The rickshaw has been introduced into S. Africa, India, and the Far East, and is a favourite vehicle with Europeans for short journeys. See Japan.

Ricochet. Term used in gunnery, when a gun is fired at a low elevation, and the shot often rebounds after striking the surface it first hits. Such a method of fire was once a recognized form of tactics in sea warfare, when round shot were used, and the ricochet shot did not rise much. The modern



1. Preparing to mount. 2. Mounting. 3. Start of canter. 4. Seat at full canter. 5 and 6. Sitting and rising in saddle during trot. 7. Seat in gallop and, 8. in full gallop. 9. Taking off for a jump. 10. Sitting back when well over the obstacle. 11. Preparing to dismount. 12. The dismount. *Specially drawn by Charles M. Sullivan*

RIDING : MOUNTING AND THE CORRECT SEATS IN HACKING AND HUNTING

rified projectile, however, tends to rise much more sharply after a ricochet, and so loses much of its chance of hitting an object. The term is also used in musketry. *Pron.* Rik-o-shay.

Ridd, JOHN. Hero of R. D. Blackmore's novel *Lorna Doone*. A farmer of Exmoor, he inherited a feud with the lawless Doones (*q.v.*), but after many difficulties he succeeded in marrying Lorna. He is represented as a man of immense strength and size, a noted wrestler, but gentle, even simple in manners. The name was borrowed from real life, for stories of Devon and Somerset tell of a real John Ridd, famous for his feats of strength. *See* Lorna Doone.

Riddell, GEORGE ALLARDICE RIDDELL, 1ST BARON (b. 1865). British newspaper proprietor. He was born May 25, 1865, son of James Riddell, of Duns, co. Berwick. After studying the law, he practised for a time as a solicitor. He then entered the journalistic and publishing world, and became a director of several companies, including *The News of the World, Ltd.*, and *The Western Mail, Ltd.* He acted as liaison officer between the British Government and the Press during the Peace Conference at Versailles, 1919-20. Knighted in 1909, and made a baronet in 1918 for his war services, he was raised to the peerage in 1920 as Baron Riddell of Walton Heath.



1st Baron Riddell,
British newspaper
proprietor
Lefayette

Riddell, CHARLOTTE ELIZA LAWSON (1832-1906). British novelist. Born Sept. 30, 1832, daughter of James Cowan, of Carrickfergus, she married J. H. Riddell (d. 1880) in 1857, and wrote many novels and short stories, the scenes of many of which were



Charlotte Riddell,
British novelist

laid in London, including *The Ruling Passion*, 1858; *George Geith of Fen Court*, 1865, dramatised in 1883; *Far Above Rubies*, 1867; *Austin Friars*, 1870; *A Struggle for Fame*, 1883; *A Silent Tragedy*, 1893; *Footfall of Fate*, 1900. She was part proprietor and editor of *The St. James's Magazine*. She died at Hounslow, Sept. 24, 1906.

Riddle. Puzzling or enigmatical question. The most famous riddle is that supposed to have been propounded by the Sphinx: "What animal is that which goes on four feet in the morning, on two at noon, and on three in the evening?" The answer, discovered by Oedipus, was "man, for when an infant he creeps on all fours, when he has attained maturity goes on two feet, and when old uses a staff." Frequently the answer to a riddle embodies a pun, as in Rowley's *Puniana*, 1867. *See* also *Devinettes Populaires de la France*, E. Rolland, 1877; *Proverbs et Devinettes*, J. J. Bladé, 1879; *The Hundred Riddles of the Fairy Bellaria*, C. G. Leland, 1892.

Rideau. Lake, river, and canal of Ontario, Canada. The lake is 42 m. S.W. of Ottawa, and discharges into the river which joins the Ottawa river at Ottawa. The canal, built 1826-34 for military purposes, connects Ottawa with Kingston, on Lake Ontario, by means of the river and lake, and by connexions with Mud Lake and the Catarqui river. The canal is 126 m. long, and 4½ ft. deep in the navigable channel. *See* Ottawa.

Ridge. Elongated high land. Usually a ridge has an almost level skyline, from which the land slopes on both sides. When one slope is much steeper than the other, the ridge forms a scarp; when the slopes are almost equally steep, it is a hog's back. A ridge is, in general, due to the exposure of a more resistant stratum by the denudation of adjacent softer rocks, and its direction follows the line of outcrop of the hard rock. The Chilterns, Cotswolds, and N. and S. Downs are ridges exposed by the denudation of clay beds. The term is also applied to formations of similar contour on the floor of the Atlantic Ocean; *Mountain*.

Ridge, WILLIAM PETT (b. 1864). British novelist. Born near Canterbury, he was educated at the Birkbeck Institute. His work, which is characterised by a humorous and sympathetic understanding of the lower and lower-middle class life of London, includes *Mord Em'ly*, 1898; *'Erb*, 1903; *The Wickhamses*, 1906; *Name of Garland*, 1907; *Thanks to Sanderson*, 1911; *The Kennedy People*, 1915; and *The Busting Hours*, 1919.



Wm. Pett Ridge,
British novelist
Elliott & Fry

Ridgeway, SIR JOSEPH WEST (b. 1844). British administrator. Entering the army in 1861, he served in the Afghan War, 1879-80; was appointed political secretary to Lord Roberts and was under-secretary to the government of India, 1880-84. Having successfully carried out a special mission to Russia, 1886-87, he became under-secretary for Ireland, 1887-93; was governor of the Isle of Man, 1893-95; and governor of Ceylon, 1896-1903. He was knighted in 1891.



Sir J. West Ridgeway,
British administrator
Elliott & Fry

Ridgeway, SIR WILLIAM (b. 1853). British archaeologist. Born at Ballydermot, Ireland, Aug. 6, 1853, he studied in Dublin and Cambridge, and became professor of archaeology at Cambridge, 1892. He was president of the Royal Anthropological Institute, 1908-10, and of the Classical Association, 1914. He was knighted, 1919. Among his numerous works are *The Early Age of Greece*, 1901; *Who were the Romans?*, 1907; *The Oldest Irish Epic*, 1907; *The Origin of Tragedy*, 1910; *The Dramas and Dramatic Dances of non-European Races*, 1915.



Sir William Ridgeway,
British archaeologist
Elliott & Fry

Riding. Term applied to horsemanship, which may be broadly defined as getting the best work out of a horse for a given object, with a minimum of distress to horse and rider. Much has been written about "hands," i.e. the control of a horse by the rein, and more about "seat."

"Hands" cannot be acquired; the natural sensitiveness and responsiveness, together with the capacity for understanding the animal one is riding, are inborn. In the "seat" it is usual to endeavour to combine elegance with firmness. Cavalry and hack riders have the leg slightly bent, many cross-country riders prefer a shorter stirrup, whereas the cowboy, who is as often in the saddle as on foot, rides with an absolutely straight leg. The cowboy, however, rides from his saddle, a massive and weighty article fashioned to meet the necessities of his calling. The Australian bushman, at

least as good a horseman, rides with a different seat on an entirely different kind of saddle. The Red Indian, who rides barebacked, sits right forward on the withers, with the knees much bent when going at speed, in an attitude much like that adopted by the American jockey, Tod Sloan. In England one will best conform to the national school of riding by carefully observing the old jingle: "Your head and your heart keep up. Your hands and your heels keep down. Your knees keep close to your horse's sides, and your elbows close to your own."

The recognized paces of the horse are the walk, the trot, the canter, and the gallop. The trot is the natural pace as an alternative to the walk, and the acquirement of a good seat when trotting is the first object of the tyro horseman. The canter is of all paces the easiest to sit, and most delightful to the rider; unfortunately it is injurious to the horse, inasmuch as the weight comes constantly on the same leg, and is on that account to be deprecated. Certain communities which spend much of their time in the saddle have succeeded in cultivating a modification of the canter, a "lope," in which this disability is remedied.

Riding has been divided into numerous heads, which vary with the judgement of the individual. Ordinarily the following classification is adequate. 1. Hacking, i.e. ordinary riding—on the Row or along the road or over the downs, with no particular object but merely for the sake of being on horseback. 2. Hunting, i.e. riding across country to hounds, which makes the highest demands on the skill, nerve, and judgement of the horseman. 3. Military riding, under which rough riding may certainly be included; this comprises all the horsemanship required by ordinary military duties, as well as the ability to ride across any kind of practicable country at speed. It has become fashionable for ladies to forsake the old side saddle for riding straddle legs like men. It is assuredly no safer, and it is certainly not so elegant.

C. E. Benson

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Riding. Literally, the third part, a corruption of thridding. Of Scandinavian origin, the word was brought by the Danes into England, and just before and after the Norman Conquest a number of counties were divided into ridings with riding courts. To-day the division still persists in the county of York, which is divided into three ridings, East, North, West. Each is an administrative county with its own lord-lieutenant and county council. The county of Cork is divided into two ridings, east and west. See Yorkshire.

Ridley, MATTHEW WHITE RIDLEY, 1ST VISCOUNT (1842-1904). British politician. Born in London,



Ridley

July 25, 1842, he belonged to an old Northumberland family, his father being Sir Matthew White Ridley of Blagdon Hall, possessor of a baronetcy dating from 1756. He was educated at Harrow and Balliol College, Oxford, doing remarkably well at both and winning a fellowship at All Souls. In 1868 he entered Parliament as a Conservative, and from 1878 to 1880 was under-secretary to the home office, and in 1885 financial secretary to the treasury. He lost his seat in Northumberland in 1885, and represented the Blackpool division, 1887-1900. In 1895, having just failed to secure election as speaker, he was made home secretary. He retired and was made a viscount in 1900, dying at Blagdon, Nov. 28, 1904. Ridley did much to develop the port of Blyth, where he owned land and coal mines. His son, Matthew White Ridley (1874-1916), who became the 2nd viscount, was Unionist M.P. for Stalybridge, 1900-4, and a prominent tariff reformer.

Ridley, NICHOLAS (c. 1500-55). English prelate. Born in Northumberland, and educated at Pembroke Hall, Cambridge, he soon became prominent as a reformer. In 1537 he was appointed chaplain to Archbishop Cranmer, chaplain to Henry VIII and canon of Canterbury, 1541, canon of Westminster, 1545, bishop of Rochester, 1547, and bishop of London, 1550, in



Nicholas Ridley,
English prelate

succession to Bonner. In addition he held two country livings, and was one of the bishops who prepared the first prayer book of 1548. The foundation of S. Thomas's Hospital and of Bethlehem (Bedlam) Hospital was due to his initiative. When Edward VI died he sided with Lady Jane Grey, and was committed to the Tower by Mary at her accession. In 1554 he was condemned for heresy, and, with Latimer, was burnt at Oxford, Oct. 16, 1555.

Riego y Nuñez, RAFAEL DEL (1785-1823). Spanish soldier. Born in Asturias, he early showed a patriotic spirit, and joined the forces which were fighting against France. He was, however, soon taken prisoner and spent some years in captivity. He returned at the peace of 1815, and was the leader of the insurrection of 1820, after which he held high positions in the state, being president of the Cortes in 1823. In the same year he was again taken prisoner by the French, handed over to the royalists, and executed at Madrid, Nov. 7, 1823. The hymn of Riego is one of the most popular of Spanish songs, especially among republicans and revolutionaries.

Rieka. Yugo-Slav name for the seaport of Fiume (*q.v.*).

Riel, LOUIS (1844-85). Canadian rebel. Born at St. Boniface, Quebec, Oct. 23, 1844, the son of another Louis Riel, he had Indian blood in him. After spending a year or two in the U.S.A., he returned to Canada in 1868, and came to the front as the leader of those who disliked the transference of the Hudson Bay territories to the new Dominion. The malcontents, having seized Fort Garry, called a convention and chose Riel as president of the government they set up. By them an Orangeman, Thomas Scott, was put to death, and then followed the Red River Expedition, under Wolseley, 1870, that crushed the movement.

Riel escaped, and in 1873 was elected a member of the Dominion Parliament. He was expelled, again elected, and then outlawed, after which he passed some time in retirement, due in part to his mental condition. In 1885, however, he was asked by the half-breeds to champion their cause; a rebellion ensued, and, that having been crushed, Riel surrendered. He was

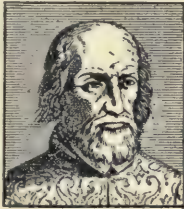


Louis Riel,
Canadian rebel

found guilty of treason and was hanged at Regina, Nov. 16, 1885, an event that aroused hot passions in Canada. See *The Creation of Manitoba*: or, *A History of the Red River Troubles*, A. Begg, 1871; *History of the Hudson Bay Company*, G. Bryce, 1900.

Riemann, GEORG FRIEDRICH BERNHARD (1826-66). German mathematician. Born at Breselenz, Hanover, Sept. 17, 1826, he studied mathematics at Göttingen, where he was a pupil of Gauss, and at Berlin, under Jacobi. He successively became privatdocent, 1854, adjunct professor, 1857, and professor, 1859, at Göttingen, and died July 20, 1866. Riemann was one of the most brilliant mathematicians of the 19th century. He suffered ill-health and was severely handicapped by poverty, but despite these drawbacks his work on non-Euclidean geometry, on the theory of functions of a complete variable, and on the surfaces which bear his name, stamp him as a mathematician of the highest originality.

Rienzi, COLA DI (c. 1313-54). Roman patriot. The son of an innkeeper, he became a notary. Embittered by the death of his brother, who had been murdered by a patrician, Rienzi threw all his energies into the cause of the people. A visit to Clement VI at Avignon, 1343, brought him to more public notice. On Whitsunday, May 20, 1347, Rienzi's plans took shape in the calling of a national council on the Capitol Hill. There he harangued the people, and was soon after proclaimed tribune. Asserting his jurisdiction over the other cities of Italy under the title of dictator, he cited the emperor and the electors to appear before him. In face of the opposition of the nobles and the impossibility of maintaining the position he claimed, his popularity soon waned, and after a few temporary successes against the nobles he was crushed, Dec. 15, 1347, and fled. In 1354, after many imprisonments and vicissitudes, Rienzi was sent as senator to Rome by Innocent VI, but he had lost his popularity, and while attempting to quell a riot he was killed, Oct. 8, 1354. Bulwer Lytton, who proposed to write a *Life of Cola di Rienzi*, made him the central figure of his historical



Cola di Rienzi,
Roman patriot

romance *Rienzi, the Last of the Roman Tribunes*, which adheres closely to the facts, and was written in Rome. On this Wagner based his opera, first produced in 1842.

Riesa. Town of Saxony. It stands on the Elbe, 33 m. by rly. N.W. of Dresden. A rly. junction, its chief industry is shipping, and it is one of the most flourishing river ports on the Elbe, exporting coal, grain, etc., and has steamers to Dresden and elsewhere. There are several manufactures, and before 1919 Riesa was a military centre. Pop. 15,300.

Riesengebirge (Ger., giant mountains). Mt. range of Germany. It is 23 m. long, separating Bohemia from Prussian Silesia. It forms part of the great Sudetic system which extends from the Oder to the Elbe. Its outlines are undulating rather than rugged, while the valleys are extremely beautiful. The geological formation of the range is a blend of granite and gneiss. The highest peaks are the Schneekoppe, 5,260 ft., and the Brunnenberg, 5,120 ft.

Riesi. Town of Sicily, in the prov. of Caltanissetta. It is 14 m. S. of the town of Caltanissetta, and is noted for its wine and oil. Sulphur is worked in the adjacent mines. Pop. 15,000.

Rieti. City of Italy, in the prov. of Perugia. The ancient Reate, it stands on the river Velino, 15 m. direct and 25 m. by rly. S.E. of Terni. It has a cathedral dating from 1456, and an episcopal palace of the 13th century. It trades in wine, oil, and cattle. Reate, which was a Sabine city, received the Roman franchise in 290 B.C. It was sacked by the papal troops in 1799. Pop. 14,000.

Rievaulx. Village of Yorkshire (N.R.), England. On the Rye, its name a corruption of Rye Vale, it is 3 m. from Helmsley, its station on the N.E. Rly. It is famous for the ruins of its abbey, the oldest Cistercian house in Yorkshire. Founded about 1130, its remains consist of parts of the choir and transepts of the church, the refectory, chapter house, etc. In 1920 the ruins were carefully examined and a good deal of the nave was cleared and its plan traced. It had six chapels, and two of their altars were found to be practically perfect. See *Abbey*.

Rif OR **ER-RIF.** Mountainous dist. in N. Morocco, bordering upon the Mediterranean. The mountains extend for about 180 m. from the W. frontiers of Algeria to the Jebel Hassan, S.W. of Tetuan, whence a N. spur, known as the Sierra de Bullones, runs towards Ceuta and terminates in the Jebel Musa. The country, which falls within the Spanish zone, is wild and difficult of access. The Berber tribes are turbulent, and have been in constant insurrection against Spain. The principal port of entry is Melilla. Fighting took place between the tribesmen and Spanish troops, resulting in the heavy defeat of the latter, July-Aug., 1921. See *Morocco*.

Rifle. Firearm of the musket type, having a specially grooved barrel. In it the bullet is thus caused to rotate during its passage through the barrel. The rotation is maintained during flight and increases the accuracy of fire. The invention of rifled firearms occurred about 1500, and is generally ascribed to August Kotter, of Nuremberg. The rifle had become sufficiently general by 1563 for the Swiss to institute special rules regarding its use in competitions against smooth bores. It was, however, only very slowly adopted for military purposes. The British learnt the value of the military rifle in the American War of Independence, when they were opposed by large bodies of men armed with the sporting rifles which were their private property, and it became necessary for Britain to subsidise corps of Continental jägers who were armed with rifles, to compete against the American marksmen.

After the war these mercenary troops were replaced by the King's Royal Rifles. The Rifle Brigade had been equipped with the Baker rifle in 1800. The great difficulty with the weapon was still its slow loading, and various expedients were tried in the way of



Rievaulx, Yorkshire. Ruins of the Cistercian abbey, from the south-east

using smaller bullets, which were expanded into the rifling by hammering them on to a projecting stud or shoulder after they had been dropped to the breech end of the barrel.

In 1835 W. Greener invented a new bullet of oval shape, smaller than the bore, with a hollow, flat, rear end, a tapered plug of hard metal being fitted in this hole. The explosion of the charge drove the plug into the bullet, expanding the latter in the rifling. In 1852 the Government adopted the Minié bullet, which acted in a similar way, and this was used in the Kaffir War and the Crimea. Muskets were not, however, really displaced until the Enfield rifle was adopted in 1855. The Prussians were the first nation to realize the advantages of breech-loaders for military use, and introduced the needle gun (*q.v.*) in 1841, being followed by the French with the Chassepot, a similar weapon.

The first move in this direction by the British Government occurred in 1866, when the muzzle-loading Enfields were converted to breech-loaders by the addition of Snider's breech-block. This mechanism was a side-hinged block through which the striker passed, and which when swung out gave access to the breech-end of the barrel. With this rifle the Boxer metallic cartridge was employed, and the latter made breech-loading a final success by preventing the escape of gas and flame from the breech. Rifles of this type were adopted about the same time by all the powers, the next advance in the way of improved breech-blocks being the British adoption of the Martini-Henry rifle in 1871.

Magazine Actions

At this time magazine actions were coming into vogue, the Winchester being introduced in 1867, but the Germans were the first to adopt a magazine rifle by converting their 1871 Mausers into a magazine rifle holding eight cartridges in the fore-end, in 1884. In the following year France followed with the Lebel, a rifle of similar construction, but one with a great advantage in that it used smokeless powder for the first time.

In 1886 Austria adopted a Mannlicher rifle provided with a Lee box-magazine into which the cartridges were loaded from a clip, thus introducing a principle found on every modern military rifle in practically unchanged form. All these military rifles fired a short bullet of a bore between .430 and .450. In 1883 Major Rubin, of the

Swiss army, introduced a small calibre rifle using a longer bullet composed of a lead core in a copper case. The British Government conducted experiments with this new type of projectile, and, as a consequence, adopted the .303-in. Lee-Metford rifle in 1888, an example followed by the other powers.

The success of the small bore rifle depended not only on the lessened air resistance of the projectile, but also on the introduction of smokeless powder. Calibres have varied little since this development, and now all military rifles are between .256 and .315 inch. About 1900 the rifles of all the powers were about equal as regards type and performance, but at that time a shorter weapon was successively introduced by Switzerland, Great Britain, and the U.S.A. These are considerably handier weapons than the longer type, but not quite so accurate for slow deliberate shooting, and all modern rifles with the exception of the French Lebel are capable of being loaded from clips.

Pointed Bullets

The next development was the introduction of the pointed bullet by the Germans in 1905, followed by France and the other powers. Owing to its greatly lessened air resistance, this bullet has a much flatter trajectory, so that the range with "fixed" or "battle" sights is increased from about 500 to 700 yards, and the "dangerous space" is very greatly increased. Muzzle velocities have risen to about 2,900 ft. per second.

For sporting purposes, as previously mentioned, the rifle kept ahead of its military use, and many are made in much the same form as sporting shot-guns with bores from .360 to .600 in. Most of these fire a short bullet, and the majority employ smokeless powder, but this is not advisable in calibres in excess of .450. In addition, there is now a wide choice of magazine sporting-rifles of similar construction to the military types, with the exception of the fore-end being shorter and the finish better. Dum-dum ammunition is usually employed to give greater stopping power to the small bullet. Combination guns are also used, in which a rifled barrel is used in conjunction with one or two shot-gun barrels, and in other types special barrels provided with a short length of rifling near the muzzle, or special shallow rifling the whole length, are used for either shot or bullets.

In order to reduce the cost of tuition the Morris tube was introduced, but this has now been

almost entirely superseded by the miniature rifle, a weapon similar to the full size rifle in other respects, but firing a cartridge of .22 in. calibre with great accuracy up to 150 yards.

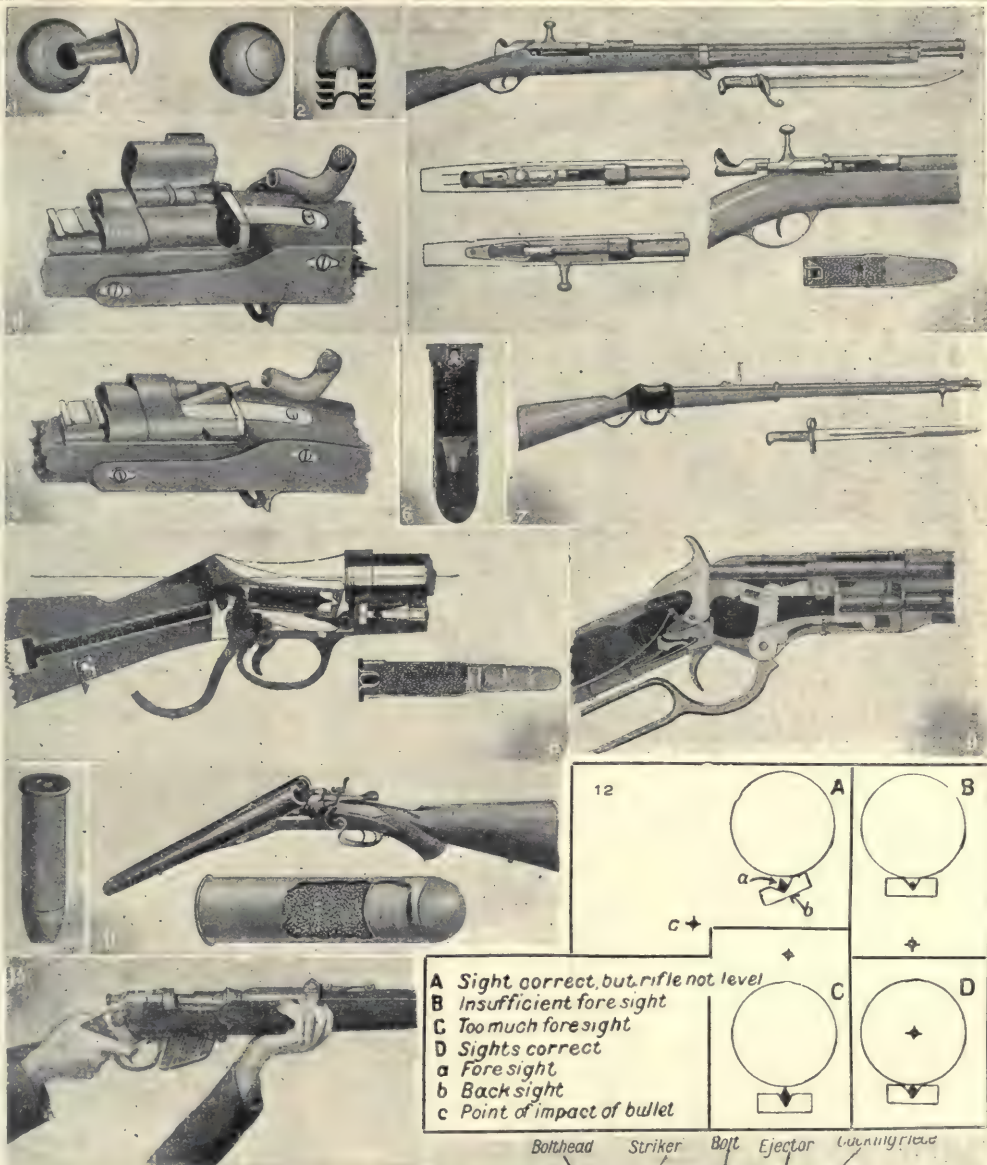
To learn to become a successful rifle-shot needs much painstaking practice, and a written article on the subject cannot do more than indicate some of the more important rules which should be observed and applied in the actual use of the weapon. The owner of a rifle should make himself thoroughly acquainted with its mechanism and find out, not only how the various parts function, but also the reason for their inclusion. The care of the weapon is another matter of great importance. It must be protected from rough handling, and every precaution taken to prevent all parts being attacked by rust. The best preservative is vaseline, and no cleaning materials should be used on any part except flannelletts and petroleum oil, care being taken that the latter is thoroughly removed and vaseline applied before the weapon is put away. In cases of very bad fouling of the barrel, it may be necessary to rinse the latter with hot soda and water.

Loading should be practised with dummy cartridges, and aiming practised with the empty rifle. In aiming, the first essential is to hold the rifle correctly, and whether the firer is standing, kneeling, sitting, or lying, the body and feet should be disposed so that they give the most comfortable, steady, and stable position possible. No success can be attained if there is a tendency for the body to sway.

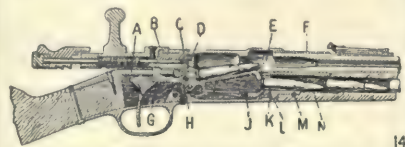
Method of Holding

The rifle should be gripped at the small of the butt by the right hand, the end of the first finger placed on the lowest point of the trigger and the other fingers extended as far round the small of the butt as possible. The left hand should grip the rifle beneath the back-sight, fingers extended up the side and the rifle pulled well into the shoulder, the left elbow being vertically under the rifle. The method of holding the weapon is illustrated by a sketch. The sights used on rifles vary to a very considerable extent, but the majority of weapons are fitted with "open" sights, in which the back-sight is provided with a U or V groove, whilst the fore-sight is either a vertical leaf, a pyramid, or barleycorn.

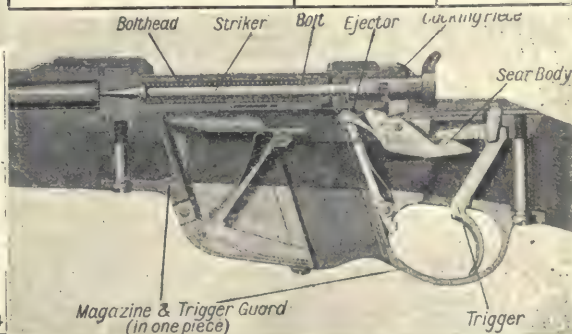
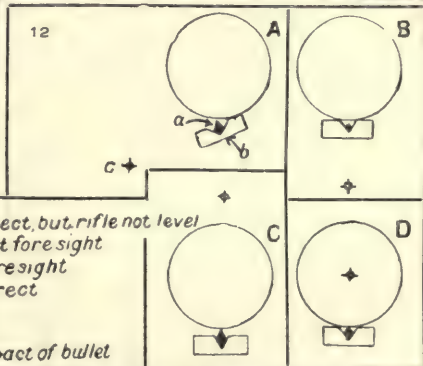
In addition or substitution "aperture" sights are often fitted, the back-sight being a disk provided with a circular hole and the



- A Body Tang
B Connecting Rib
C Bolt-head
D Ejector Screw
E Locking Recesses
F Lug groove
G Body Reinforce
H Sear Spring
I Carrier Axis pin
J Retaining Spring Pivot
K Cartridge in Magazine
L Fore end position Hook
M Magazine Tube pin
N Magazine reinforce



- A Sight correct, but, rifle not level
B Insufficient fore sight
C Too much fore sight
D Sights correct
a Fore sight
b Back sight
c Point of impact of bullet



1. Expanding bullet of Delvigne carbine. 2. Minié bullet. 3. French chassepot, showing bolt action and section of cartridge. 4. Snider bolt action open and, 5, closed. 6. Section of boxer 577 cartridge. 7. Martini-Henry rifle and bayonet. 8. Breech mechanism of Martini-Henry and section of cartridge. 9. Action of

Winchester repeating rifle. 10. Winchester '44 cartridge. 11. Double elephant rifle and cartridge. 12. Diagrammatic explanation of common errors in sighting. 13. Correct method of holding rifle. 14. Action of Lebel (French) magazine rifle. 15. Action of Mannlicher (Austrian) rifle. For further description see text

RIFLE: MECHANISM AND CARTRIDGES OF STANDARD PATTERNS

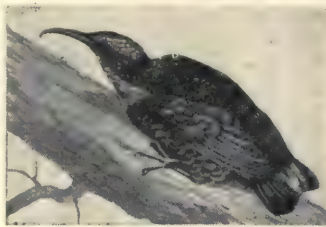
fore-sight a bead; whilst some sporting rifles have a telescopic sight, consisting of a small telescope conveniently mounted and fitted with cross wires in the field. Open sights are correctly alined when the tip of the fore-sight is exactly level with the shoulders of the back-sight and appears exactly in the centre of the notch, whilst in the case of aperture sights the bead should be in the exact centre of the aperture. The sights, of whatever type they may be, must then be alined on the lowest point of the object it is desired to hit, that is, assuming the object to be marked like the face of a clock, at the point where VI appears on the circumference, and the rifle must be held perfectly level, a fact shown by the observation that the shoulders of the back-sight are exactly horizontal. Sketches illustrating correct and incorrect aims on a "bull's eye" are given to indicate what is necessary in this respect.

Trigger pressing is the next matter to receive attention, as any tendency to pull the trigger will result in the shot being deflected to the right. The correct position of the trigger finger has already been given, and the rifle is fired by squeezing the small of the butt with the right hand. This action will result in the trigger finger exerting a gradually increasing pressure, which will fire the rifle without disturbing the aim. Aiming should be practised by alining the sights on the target with the rifle held on a stand or rest, the result being noticed by looking through the barrel with the bolt removed, and then considerable practice should be made by "snapping" the unloaded weapon after sighting, and noting that the aim has not been disturbed by the act of firing.

The first practice with the loaded weapon should be made on a bull's-eye target, five shots being fired with exactly the same aim for each. If all the rules have been observed the shots will all be close together, and practice must be continued until this is attained. If the group so made is not in the centre of the target, an incorrect aim has been taken, and may be corrected in subsequent practice; but the first essential is to be able to place all the shots together, by taking a perfectly constant aim and firing the rifle correctly. Subsequent practice should be made against figure targets at gradually increasing range.

Owing to the fall of the bullet due to the action of gravity, it is necessary to adjust the height of the back-sight to allow for the

fall at various distances, and the ability to judge the distance of the target from the firing point is most



Rifle Bird, an Australasian bird of paradise

essential to successful shooting, whilst the allowance that must be made for the effect of wind on the bullet is a factor which requires much experience to estimate with accuracy. The employment of rifle fire in warfare introduces further problems, as it is necessary to train the men to fire rapidly and accurately under difficult conditions, whilst the effective control of the fire under trying conditions is a matter of great importance. The secret of success in rifle shooting, whether for hunting, competition shooting, or warfare, is perfectly steady nerves, combined with physical fitness, so that in all situations the firer never becomes flurried, but takes a steady aim, with correctly adjusted sights, whilst the correct method of trigger pressing and the operations of loading and aiming become absolutely instinctive actions. See Ammunition; Bullet; Cartridge; Chassepot; Firearms; Flintlock; Fusil; Gun; Lee-Enfield; Matchlock; Mauser; Musket; Needle-gun; Propellant; Ross Rifle; Wheel-lock. E. de W. S. Colver

Rifle Association, NATIONAL. Association founded in London, Nov., 1859, for the promotion of rifle-shooting. Its establishment was thus contemporaneous with the formation of the volunteer force which was raised to meet the supposed danger of invasion by the French. Meetings were held on Wimbledon Common every summer until 1890, when the annual camp was removed to Bisley. The N.R.A., which received its charter of incorporation in 1889, and to which many county and overseas associations are affiliated, is the recognized controlling authority on all matters connected with rifle-shooting. During the Great War it did good work in supplying trained musketry instructors to the army, and its



National Rifle Association badge

ranges at Bisley were used for a time as the headquarters of the School of Musketry. See Bisley; King's Prize; Volunteers.

Rifle Bird OR RIFLEMAN (*Ptiloris paradisæ*). Genus of birds of paradise. It is found in Australasia and New Guinea. It has purplish black plumage with green and bronze reflections, the throat being covered by a shield of feathers of a metallic lustre.

Rifle Brigade. Regiment of the British army. Raised in 1800, this regiment is also known as The



Rifle Brigade badge

Prince Consort's Own. As part of the Light Division during the Peninsular War it gained a distinguished record, which subsequent campaigns have enhanced. During the years 1807-15 it added 17 battle honours to its roll, and in the Kaffir Wars of 1846-47 and 1851-53 it did splendid service. The Crimean War, the Indian Mutiny, the Ashanti War, 1874, the Afghan War, 1878-79, the Burmese War, 1885-87, and the Sudan campaign, 1898, gave opportunities for further distinction. In the South African War the brigade shared in the defence and relief of Ladysmith.

The regiment had, in addition to its regular battalions, a number of service and territorial battalions in the Great War. The 1st, which formed part of the expeditionary force, was in all the great battles of 1914, from Mons onward, and in addition to distinguishing itself in subsequent campaigns in France and Flanders, helped to defeat the German offensive of March, 1918, and participated in the final victories of that year. The 2nd battalion was conspicuous in the fighting of 1915, and in the British offensive, Sept.-Nov., 1918. The 3rd fought at Mons and the Marne in 1914, in the Ypres area in 1916; and the 4th distinguished itself at St. Eloi and Neuve Chapelle in March, 1915.

The brigade, as a whole, was very prominent in all the British battles on the west front—Loos, Somme, Arras, Messines, and Passchendaele. There were also battalions in Egypt, Palestine, India, Mesopotamia, and Salonica. The regiment gained 10 V.C.'s, 206 D.C.M.'s, 9 M.C.'s, 914 M.M.'s. Its death roll was 11,245, and to perpetuate their memory a memorial has been erected at Winchester, where also is the regimental depot.

Rifle Corps, KING'S ROYAL. Regiment of the British army, known also as the 60th Rifles.



King's Royal Rifle Corps badge

Formerly the 60th Foot, this regiment was raised in 1755, and took a leading share in the campaigns in America. It proceeded to Portugal in 1808, bearing a prominent part in all Wellington's campaigns down to 1814. In the second Sikh War the regiment was engaged at the siege of Multan and the battle of Gujarat. Stationed at Meerut at the outbreak of the Indian Mutiny, it took part in the first six months' hostilities, which included the siege and capture of Delhi. It saw service in the China War, 1860, and the Afghan War, 1879-80, accompanying Lord Roberts in his march to Kandahar. The Egyptian War of 1882, and the Sudan Campaign, 1884, added to the regiment's battle honours, and in the South African War it helped in the defence of Ladysmith.

In the Great War the regiment had six regular and special reserve battalions, and about 20 service battalions. The 1st and 2nd battalions took part in all the great battles of 1914. After winning distinction throughout the ensuing campaigns, the former rendered special services in the battles of Bapaume and Epéhy, 1918. The 2nd batt. was at Loos, 1915, and formed part of Rawlinson's Fourth Army in the autumn advance of 1918.

The 3rd and 4th battalions were conspicuous in the fighting around Ypres in 1915, and the 4th rendered special services in the closing battles of the war. A battalion of the King's Royal Rifle Corps, along with men of the Northampton, put up an heroic resistance against the Germans when attacked in the Nieuport sector at Lombartzyde (*q.v.*), July, 1917. Service battalions distinguished themselves on the Somme, and in all the critical battles of 1918, while the 21st batt. formed part of the British force in Italy, 1917-18. The regiment's casualties were officially 11,338 of all ranks killed. A cadet corps of the Church Lads' Brigade (*q.v.*) was affiliated to the K.R.R.C., known as the 16th battalion, and specially distinguished itself at Neuve Eglise in 1918. In Dec., 1920, the name of the regiment was altered to The King's Royal Rifles, but in March, 1921, it reverted to its previous title. The depot is at Winchester.

Rifle Grenade. Grenade fired from a rifle. Rifle grenades have been developed from hand grenades, in order to provide these effective missiles with a longer range, and most types are of very similar construction to the hand-thrown grenade, but are capable of being thrown up to 400 yards. Most rifle grenades function by impact, and the method of propulsion is of two types. The first and most general requires the base of the grenade to be fitted with a metal rod of such external diameter that it is a good fit in the rifle barrel.

These rods are generally copper plated in order to prevent rusting, and a special blank cartridge is necessary to fire the missile. The second type of grenade is used without a rod, and is perforated by a longitudinal hole of the same internal diameter as the bore of the rifle, which has a cup attached to the muzzle to hold the grenade. This type is thrown by an ordinary cartridge provided with a bullet, the latter passing through the perforation in the missile, and usually this type of grenade functions by a time-fuse, as it is not so certain to hit the target "nose on" as the former type.

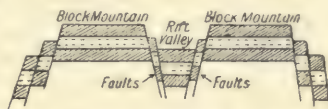
The rifle is fired at an elevation of 15-45 degrees, but an ordinary cartridge is used. The bullet strikes the percussion cap in passing through the grenade, the flash from the cap igniting the pellet, which is arranged to burn for the average length of time of flight of the missile. When the pellet has burned through it fires the detonator, which initiates the high explosive, and the grenade explodes. See Ammunition; Grenade; and the various types of grenades described under their distinctive names.

Rifle Range. Stretch of land affording facilities for rifle practice with ball ammunition at various distances from the target. These distances are, for miniature rifles, from 25-100 yds., and, for service rifles, from 200 yds. up to 1,000 yds. or more. The targets on full-sized ranges are provided with good cover for the markers, and arrangements for raising and lowering the targets as required. There is also telephonic communication between the markers' shelter-pit and the firing-point in use, while the employment of flags reduces the risk of accident on the range to a minimum.

The butts which receive the spent bullets are massively constructed and fairly high, but recruits may send a shot singing over the butt, so that in open country

a considerable area has to be kept clear while firing is going on. The roads and paths leading through the danger area are therefore patrolled, and a red flag is flown as an additional warning to wayfarers. In some cases the targets are placed against a hill-foot, or in a gravel pit, etc., thus giving complete safety to civilians behind the butts. The majority of miniature rifle ranges are limited to 25 yds., occasionally 50 yds., and constructed under cover. This enables training to be continued in towns and barracks under all conditions of weather. See Bisley.

Rift Valley. Type of valley produced by the sinking of a crustal block between two parallel faults. During the formation of a fold in the earth's crust, the pressure is generally so steadily ex-



Rift Valley. Diagram illustrating causes of rift formation

erted that the rocks are gradually compelled to fold. In some cases, however, the strata cannot withstand the strain, and fractures occur, causing some crustal blocks to be raised, and others depressed relatively to each other, while the sinking of the land between two fractures or faults will produce a rift valley. The Red Sea, as is indicated by its length and width, and its steep, straight sides, occupies part of a rift valley, which extends from the valley of the Jordan to Lake Nyasa, in Central Africa. Glenmore and the Central Lowlands of Scotland are also examples of this type of valley. See The Great Rift Valley, 1896; Rift Valleys and Geology of E. Africa, J. W. Gregory, 1921.

Riga. Baltic seaport and capital of Latvia. It stands on the Dvina, 6 m. from its mouth. Before the Great War it came next in importance to Petrograd on the Baltic, and its large trade and many fine buildings led it to be styled the Queen of the Baltic. It was the seat of the governor-general of the Baltic provinces of Russia, and one of the chief centres of the Russian transit trade, while its numerous mills and factories employed 50,000 hands. It exported timber, flax, hemp, skins, butter, and eggs, imported mixed goods to the value of millions, and manufactured linens, cottons, sugar, soap, candles, dressed timber, and machinery of various kinds. More than a third of its population, which in 1914 was 520,000, was German, who,

with the Jews, controlled its commerce and industries.

The city suffered during the war and from the loss of the Russian transit trade, which, owing to the economic collapse of Russia under Soviet rule, was only very partially restored in 1921. Most of its industrial life was at a standstill, while its population had fallen by half and many of its buildings were uninhabited. Few Germans remained in it, and though there is an increasing Lettish element the bulk of the people are Jews. Founded in 1201 by Albert I, bishop of Livonia, Riga joined the Hanseatic League in 1282, and, after belonging to the Teutonic Knights, passed successively into the hands of Poland, 1582; Sweden, 1621; and Russia, 1710. In 1918-19 it became the seat of the Latvian government, which has established a Lettish university.

Riga figured prominently in the Great War. A force of Lettish

troops of the Russian army was organized in June, 1915, to resist the German attacks on the city, but the first, in Aug., failed. A general offensive opened in Oct. and by the 20th the Germans had advanced to Borkovitz on the Dvina, about 12 m. from Riga. On Oct. 25-26 severe fighting took place at Uexhuell, above Borkovitz, in which the Germans were repulsed, and their attack was continued all through that month. Early in Nov. the Lettish troops, assisted by the Russian Baltic fleet, defeated and drove back the Germans, whose great and costly effort to take Riga had failed.

In the autumn of 1917 the Germans began a fresh offensive against Riga, and after defeating the Russian and Lettish forces occupied the city on Sept. 3.

The independence of Latvia was proclaimed in Riga, Nov., 1918. The Bolsheviks captured the city in Jan., 1919, but with the aid of German troops were expelled in May. In June, Letts and Estonians attacked the latter, who had taken possession. Under order of the inter-allied mission in the Baltic, the Germans evacuated Riga. Here in 1921 the treaty of peace between the Poles and Bolsheviks was signed, the negotiations having been transferred

thither from Minsk. Pop., at the census of 1921, 245,000. See Latvia.

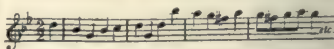
Riga, GULF OF. Large shallow opening of the Baltic Sea. It is 90 m. long and 60 broad, and its chief affluent is the Dvina. Its shores form parts of the coasts of the republics of Latvia and Esthonia. Before its entrance lie



Riga. Plan of the Baltic seaport and harbour on the Dvina

the Esthonian islands of Oesel and Dago. A series of naval actions was fought here between the Germans and the Russians, Oct. 12-21, 1917. *See* Oesel Island.

Rigadoon OR RIGAUDON. French dance. A somewhat lively but complicated dance, traditionally



said to have been invented by a dancing master of Marseilles, named Rigaud. Early in the 18th century it was danced in England to the tune of "Oh, Chloe, when I prove my passion." It retained its place as a favourite dance in Paris until the Revolution, and is still occasionally performed at French village festivals. The music was in either triple or quadruple time.

Rigaud, Hyacinthe (1659-1743). French painter. Born at Perpignan, he studied at Montpellier, and at the Academy, Paris. In 1687 he was admitted to the Academy as a portraitist, but did not qualify as an historical painter until 1700. In 1702 he became assistant professor, in 1710 professor, and in 1733 rector. He was created a nobleman of Perpignan in 1709, and died in Paris. Rigaud's principal achievement was in portraiture. Louis XIV, Philip



Riga, Latvia. Greek Orthodox cathedral, built 1877-84. Top, left, Powder Tower, remains of the old city fortress

V of Spain, Charles XII of Sweden, Augustus II and Augustus III of Poland were among his sitters, while he also portrayed many eminent artists and litterateurs of his time. *See* Bossuet; Edelinck, G.; Fleury; Philip V of Spain.

Rigby, RICHARD (1722-88). British politician. A son of Richard Rigby, of Mistley Hall, Essex, his father's wealth enabled him to secure a seat in the House of Commons in 1745. He soon became one of the followers of the duke of Bedford, the group being known as the Bloomsbury gang, and under its chief held political positions in Ireland. From 1768-84 he was paymaster-general, accumulating great wealth while holding that office. Rigby died at Bath, April 8, 1788. Mr. Rigby, a character in Disraeli's *Coningsby*, is thought to be a pen portrait of John Wilson Croker.

Rigel. Second star in the constellation of Orion, Beta Orionis. Its name means the foot. It is a first magnitude star, sixth in brightness in the heavens, and distinguished by its steel blue colour. The star is a spectroscopic binary, and it has been calculated to have a brightness equal to 8,000 suns. *See* Constellation.

Rigging. All the ropes and chains on a ship used to support or operate the masts, sails, etc. Standing rigging comprises the shrouds and stays which support the masts. Once fixed they are subject only to adjustment or renewal; they are made of wire or hemp. Wire ropes are painted or galvanised, hemp ropes are tarred, and, in both cases, they are wrapped with tarred or painted canvas and also wrapped more closely with marline or spun yarn.

Running rigging includes all the movable ropes or chains which are used in operating the upper masts, yards, sails, etc. The chief of these ropes, which are usually made of Manila hemp, are the braces by which the yards are controlled, and the halyards by which yards or sails are hoisted. The term rigging is applied to the whole system of cordage, masts, and sails of the ship; it is used sometimes in a limited sense for the shrouds.

In its widest sense the rigging determines the character of a sailing ship. The earlier vessels were square rigged, with their sails arranged across the centre-line of the ship. The fastest vessels of this type were the clippers engaged in the tea trade. *See* Ship; Tackle; Yachting.

Right. In political speech, the party or section of a party holding views of a conservative or moderate



Hyacinthe Rigaud, French painter
Self-portrait

character as opposed to the more extreme ones of the left. Its use in this sense arose in France during the Revolution. When the National Assembly formed itself at Versailles in 1789, the moderate men, quite by accident, found seats on the right of the hall, and the extremists on the left. This arrangement persisted and became part of the political system of France, so much so that the words right and left became synonyms for moderate and advanced opinions respectively, and are so used (especially in France) to-day. *See* Left; Politics.

Right Ascension. In astronomy, the measurement in degrees, minutes, and seconds of distances along the celestial equator from a fixed point on that equator. The plane of the terrestrial equator extended indefinitely to the stars is called the plane of the celestial equator. As we reckon points on the terrestrial equator as so many degrees E. or W. of Greenwich, so points on the celestial equator are measured by reference to the point on the equator occupied by the sun at the vernal equinox, the first point in Aries. The right ascension of a star is stated in hours, minutes, seconds, though measured in degrees, minutes, and seconds, 15 degrees being equal to one hour. The declination of a star together with its right ascension fixes its position. *See* Declination.

Right of Way. In English law, a form of easement involving private right to pass over land in the possession of others. By the Prescription Act, 1832, it is enacted that uninterrupted enjoyment of a right of way for 40 years is an indefeasible right, on condition that it is proved by user down to the time of the commencement of the action, unless the consent in writing of the owner has been ob-

tained to the enjoyment of the right. By the same Act "no claim by custom, prescription, or grant, to any way or other easement . . . which has been enjoyed twenty years without interruption shall be defeated by showing the commencement of the right within the time of legal memory."

A private right of way across a particular piece of land may be claimed by immemorial usage, or be granted to an individual by special permission. If an owner grant a piece of land in the middle of his field the grantee has the implicit right to cross the grantor's land without thereby committing trespass. This is called a way of necessity. Strictly speaking, a right of way means a private way, but in popular use the term is sometimes extended to include, for example, the right of the public to use a particular pathway through land in private ownership. *See* Easement; Highway; Prescription.

Rights. In political philosophy, privileges belonging to the members of a state, or community. Of the various kinds of rights may be mentioned natural, civil, political, and religious. The origin, nature, and extent of these rights occupies a large place in the writings of political philosophers, such as Hobbes and Rousseau. In English history, the measure arranging the settlement of 1688 is known as the Bill of Rights. It was preceded by the Declaration of Rights. The term has been used also for other documents embodying the political ideas of a nation. *See* Bill of Rights; Rousseau; State.

Rights of Man, THE. Exposition of democratic doctrine by Thomas Paine (*q.v.*). The first part was published in London in 1791, and the second part in 1792. The author was tried before Lord Kenyon at the king's bench for issuing "a false, scandalous, malicious, and seditious libel," and although ably defended by T. Erskine, was found guilty, but fled to France, where the book had prepared him a warm welcome. Written as a reply to E. Burke's *Reflections on the French Revolution*, it is a vigorous defence of the principles which inspired that movement, had an enormous circulation, and was widely accepted among the less educated classes as a text-book of democracy, although its blatancy and coarseness render it greatly inferior to the contemporary and more scholarly work of William Godwin.

Rights of Man and of the Citizen, DECLARATION OF THE. French Revolutionary decree issued by the Assembly and forced on the

acceptance of Louis XVI, Oct. 5, 1789. Founded on principles of political and social liberty, and prescribing the relations of individuals to the law and constitution, the declaration embodied the spirit of the Revolution and finally abolished feudalism and the old social conditions. As the charter of the people's liberty, it has been the basis of almost all subsequent European constitutions. The chief articles declare that all men are born and remain equal in rights; that social distinctions can only be tolerated as far as they are for the public good; that every citizen has a right to participate personally or by his representative in the making of laws; that public burdens should be borne by the whole community in proportion to individual abilities; that none should be imprisoned except in execution of the law, and that freedom of religion, of speech, and of the press are fundamental rights of the citizen. *See* French Revolution.

Right Whale (*Balaena*). Genus of whales, of which the Greenland whale *B. mysticetus* is the best known. They are characterised by their very large head and the absence of the back fin. The mouth is arched and contains long plates of whalebone. Of this group, the Greenland whale is not known with any certainty to have occurred in the British seas; but the Southern right whale was formerly common in the N. Sea. *See* Whale.

Rigi. Mountain mass of central Switzerland. It rises between the lakes of Lucerne, Zug, and Lowerz, and is mostly in the canton of Schwyz. It is 35 m. in circuit and has an alt. of 5,906 ft. Abrupt to the N., it slopes, with broad terraces, to the S., affording fine pasturage, while, lower down, fig and almond trees flourish. It is ascended by two mountain rlys., one from Vitznau on Lake Lucerne, and another from Goldau (*q.v.*); there are foot and bridle paths from these places, as also from Weggis and Küssnacht (*q.v.*). The summit commands a magnificent panorama, embracing the 125 m. range of the snow-clad Alps, the Jura, the Vosges, the Black Forest, and parts of Württemberg and Bavaria. Over 20 hotels have been erected among the various peaks, those at

Rigi-Kaltbad and Rigi-Scheidegg having English church services. *See* Alps; Pilatus.

Rigid. In aeronautics, an abbreviation for rigid airship. *See* Airship.

Rigidity (Lat. *rigidus*, stiff). Property of a body by which it resists change of form, the opposite of flexibility or elasticity. It is a property which very clearly distinguishes solids from fluids, for while the latter have rigidity in reference to volume, that is, they resist increase or diminution of volume, they have none in regard to form. Nevertheless, a fluid in a state of rapid motion may acquire an apparent or temporary rigidity, as a jet of water issuing at a high pressure from the nozzle of a fire hydrant. While all solids have rigidity there is no known material which completely resists a change of form under stress. This deformation is proportional to the stress, while the ratio between the stress and the deformation is called the modulus of rigidity. *See* Matter: Materials, Strength of.



Right Whale. The Greenland whale, one of the largest sea mammals, spouting

Rigor (Lat.). Severe fit of shivering occurring at the commencement or during the course of certain diseases, *e.g.* pneumonia, typhoid fever, and various forms of blood poisoning.

Rigor Mortis. Stiffening of the muscles which occurs after death. It commences usually in the neck, jaw, and face, in about six hours,



Rigi. Summit of the Swiss mountain which commands one of the finest Alpine views, and Rigi-Kulm Hotel

and is present over the whole body from 12 to 18 hours. It passes off in the same order, and has generally disappeared in 36 hours after death. Exceptionally, it may come on very quickly after death, or may be delayed for several days. The limbs stiffen in the attitude in which they were at death. The contraction can be overcome by forcibly bending the joint, and when overcome it does not recur.

Before the onset of rigor mortis, the reaction of the muscles is alkaline, but during the period of rigidity it is acid, owing to the formation of sarcolactic acid. After the rigidity has passed off, the reaction is again alkaline. The onset of rigor mortis is hastened by exhaustion of the muscles before death, as in hunted animals, or soldiers killed at the end of a long march, and also by the exhaustion produced by lingering illness; it is delayed where the muscular tone was good before death, and in persons in sound health who die suddenly.

The rigidity also occurs more quickly in young children and old people than in adults and the middle-aged. A warm temperature hastens the onset of rigor mortis, and a cold temperature delays it. Instantaneous rigidity or cadaveric spasm is a condition which sometimes immediately follows death, and in which the muscles are firmly contracted in the attitude they were in at the moment of death. It is seen in cases where death was preceded by great nervous tension or excitement. Soldiers killed in battle have been found still holding their weapons, as in life. The hands of a drowned person may be firmly closed round objects he has grasped, and a pistol or razor may be held in the hand of a suicide. *See* Death; Drowning.

Rigsdag. Scandinavian word for a national legislature, the equivalent of diet and the German Reichstag. The Danish Rigsdag consists of two houses, the Lands-ting or senate, and the elected Folketing. *See* Denmark.

Rig-Veda (Sanskrit, praiselore). Name of the oldest section of the Vedas (*q.v.*). It is a collection of 1,017 hymns addressed to Indra, Agni, Varuna, Soma, the Maruts, and other nature gods. The compilation probably dates from about 1000 B.C., but the hymns themselves, to which many authors' names are traditionally appended, may be from 1,000 to 500 years older, and are the oldest literature in any Indo-European language. More than 10,000 verses in all, in a great variety of metres, they were composed in archaic Sanskrit, and handed down by word of mouth for many generations. Most of the hymns were uttered by professional priestly reciters on the occasion of sacrifices.

Some of the hymns appear to have been composed by the Aryans before they descended into the North Indian plain. Most, however, belong to the Punjab. Taken as a whole, they throw much light on the social life and ideas of the primitive Aryan communities, which were passing from the pastoral to the agricultural stage of culture. The father of each family was its priest. Women enjoyed a position of freedom and honour unknown later. The hymns are almost devoid of references to caste and the elaborate ritual of the Brahmanic age, and combine much puerility with occasionally sublime poetic imagination. They represent a stage in religious development, nowhere else so clearly seen, in which natural powers and phenomena are worshipped as persons, but no theology or mythological system has yet arisen, though the germs of later monotheism and pantheism are already present. The Upanishads interpret the Rig-Veda in terms of philosophic mysticism. See *Indra*, etc.; *Sanskrit*; *Vedas*; consult also edition by Max Müller, 2nd ed. 4 vols., 1890-92; translation by H. H. Wilson and ed. E. B. Cowell and W. F. Webster, 6 vols., 1850-88.

Riis, JACOB AUGUST (1849-1914). American social reformer. Born in Denmark, May 3, 1849, he emigrated to the U.S.A. in 1870, and worked at various trades until 1877, when he became a journalist on *The New York Tribune*. As a police reporter he became intimate with many phases of the city life, and was active in promoting school reforms and advocating the introduction of open spaces in the more crowded districts. He wrote much about the poor of the American cities, his principal works being *How the Other Side Lives*, 1890; *The Children of the Poor*, 1892; *The Battle with the Slums*, 1902;

Children of the Tenements, 1902. *Pron. Reece.*

Riley, CHARLES VALENTINE (1843-95). American entomologist. Born at Walton-on-Thames, England, he went to America in 1860, and eight years later became entomologist to the state of Missouri. In 1878 he was appointed U.S. entomologist, and later curator of insects in the U.S. National Museum. One of his special studies was that of grape-vine phylloxera, and his studies and observations on this subject were of great importance.

Riley, JAMES WHITCOMB (1853-1916). American poet. Born at Greenfield, Indiana, Oct. 7, 1853, the son of a lawyer, he was by turns sign-painter and playwright before, in 1873, he began newspaper work in Indianapolis, contributing

his early verse to

The Indianapolis Journal, and becoming known as "the Hoosier poet." His muse is genial, sympathetic, humorous, reflecting simple homely scenes and the charm of country life, notable examples being *An Old Sweetheart of Mine*, *When the Frost is on the Pumpkin*, *The Old Swimm'g Hole*, *Green Fields* and *Running Brooks*, *Thoughts for the Discouraged Farmer*, and *Poems Here at Home*. His songs for children achieved much popularity. He died July 23, 1916.

Rimaszombat. Town in the Slovakia division of the Czechoslovak republic, also known as *Rimavská Sobota*; formerly in the kingdom of Hungary. A rly. and road junction, some 18 m. N.E. of Losonc, it is in the valley of the Rima, one of the small streams which flow from the Tatra Mts. Most of the inhabitants are Magyars, nearly half are Roman Catholics, the rest being almost equally divided between Calvinists and Lutherans. Pop. 6,900.

Rimbaud, JEAN NICOLAS ARTHUR (1854-91). Belgian poet. Born at Charleville, Ardennes, Oct. 20, 1854, he went to Paris in 1871, and, with several remarkable poems already to his credit, became known to Paul Verlaine (*q.v.*). After the rupture with Verlaine, 1873, Rimbaud travelled in England, Germany, and Italy, 1875, and then in the East Indies. After a tour of Europe with a circus troupe, he spent his later years as a trader at Harrar, Abyssinia, until

illness forced him to return to Europe. He died at Marseilles on Nov. 10, 1891. Rimbaud's works include the prose volumes, *Une Saison en Enfer*, 1873, *Les Illuminations*, 1886, and his complete poems were published in 1895. He produced comparatively few poems, and these only in his youth, but had great influence on the Symbolist movement; such unique poems as the *Bateau Ivre*, or the famous *Voyelles sonnet*, reflect his eccentric and puzzling personality.

Rime Royal. Stanza of seven decasyllabic lines, rhymed *ababbc*. It was established in England by Chaucer in his *Troilus* and very largely used in the 15th and 16th centuries, notably by Thomas Sackville, earl of Dorset, 1536-1608. The name is said to originate in the use of the form in *The King's Quair*. In the 19th century the Rime Royal was revived and used with success by William Morris.

Rimington, MICHAEL FREDERIC (d. 1858). British soldier. Born May 23, 1858, he was commissioned



Michael Rimington, British soldier

in the army in 1881. He served in Bechuanaland, 1884-85; Zulu campaign, 1888; and the South African War, 1899-1902, when he commanded Rimington's Guides. Promoted major-general in 1910, from 1911-14 he was inspector of cavalry in India. He commanded a reserve centre 1916-18.

Rimini. City of Italy, in the prov. of Forlì. The ancient Ariminum, it stands on the river Marecchia, near its mouth in the Adriatic Sea, 69 m. by rly. S.E. of Bologna. Successively Umbrian and Etruscan, the city fell to the Romans in 268 B.C. It has a triumphal arch to Augustus, a Roman bridge over the Marecchia, and ruins of an amphitheatre. A bishopric as long ago as 260, its cathedral was founded in the 13th century and rebuilt in the 15th. A monument indicates the spot where Caesar addressed his troops after crossing the Rubicon. The castle of the Malatestas is now used as a prison. The Palazzo Ruffo was the scene of the assassination of Francesco da Rimini in 1285. The library dates from 1617. Rimini has ironworks, silk mills, and mineral springs, while a trade is carried on in silk and sulphur. The fisheries are extensive.

The importance of Rimini under the Romans was chiefly due to its



being the terminus of the Flaminian and Aemilian Ways. After a very chequered history it was held by the Malatestas from the 13th to the 16th century, when it was ceded to Venice. On the shore is a popular sea-bathing station. Pop. 30,000. See Francesca; Malatesta.

Rimmon. Syrian deity worshipped at Damascus. His temple, the house of Rimmon (2 Kings v, 18), probably containing the altar which Ahaz reproduced at Jerusalem (2 Kings 16), doubtless lies beneath the Great Mosque. Alternatively called Hadad, he is identifiable with the Babylonian thunder-god Ramman and with the corresponding Assyrian Adad.

Rimnic Sarat. Town of Rumania, also known as Ramnicul-Sarat (*q.v.*).

Rimnic Sarat, BATTLE OF. Fought Dec. 22-27, 1916, between the Rumanians and Russians on one side and the Austro-Germans on the other. After losing Ploeshti, Dec. 6, the Rumanians withdrew towards Rimnic Sarat, and were joined by Russian forces. Together they fought several delaying actions, which checked the advance of the Germans under Von Falkenhayn, who, pressing on towards Rimnic Sarat, began a violent battle on Dec. 22 on a 30 m. front.

Attacking heavily, he captured several villages on Dec. 23, after a bitter struggle. He was in much superior force, both in men and artillery, and his heavy guns battered down the Russo-Rumanian entrenchments, but all through Dec. 24 and 25 he was fiercely counter-attacked, and positions changed hands several times. On Dec. 26 his strength in guns told, and he broke the Russo-Rumanian front for a distance of about 10 m., capturing some villages which were close to Rimnic Sarat, and compelling the Allies to withdraw from the town. On the night of Dec. 26-27 they took up a new position on the heights beyond it. The battle continued throughout Dec. 27, but ended in a farther retreat of the Russo-Rumanians. See Rumania, Conquest of.

Rinderpest (Ger., cattle plague). Highly contagious and fatal disease of cattle and other ruminating



animals. It is indigenous in India, China, Russia, Tibet, and other parts of Asia, but has not been found in Great Britain since 1877. A serious outbreak occurred there in 1865, when the damage to agriculture was estimated at £5,000,000 from the loss of cattle alone. Rinderpest is a common disease in South Africa, where, during one great visitation, nearly 80 p.c. of all the cattle were destroyed.

The disease arises from a specific contagion, and it is believed that the infection enters the body of the animal through the mouth or nostrils, and thence spreads to all the organs. It is a fever, with very high temperature. The pulse quickens, the coat stares, the nose becomes dry, the whites of the eyes turn scarlet, appetite fails, and the animal is seized with shivering fits. Profuse diarrhoea usually follows, and as a rule inflammation of the lungs. The disease is almost invariably fatal, death following in from four to seven days from the first attack.

The infection may be spread by hay or straw, or by any form of litter, by hides, fleeces, or flesh. It may even be carried by the air, but

the range of infection by air is not great. Infected bodies buried in the ground remain virulent for months, and even freezing does not destroy the activity of the germ. There is no cure known, but in places where it is common, animals which recover become immune, and the mortality may be reduced to 40 p.c. See Cattle.

Rinehart, MARY ROBERTS (b. 1876). American author. She was born, her maiden name being Roberts, at Pittsburg, Pennsylvania, where she was educated at public schools, and the training college for nurses. In 1896 she married Dr. Stanley Rinehart of Pittsburg. Her many novels, mostly belonging to the class of detective fiction, and good ex-



Mary Rinehart,
American author



Rimini, Italy. 1. Roman bridge across the Marecchia, built by the Emperor Augustus. 2. Triumphal arch of Augustus, erected A.D. 27. 3. Façade of the Cathedral of S. Francesco

amples of the kind, included The Circular Staircase, 1908; When a Man Marries, 1909; The Window at the White Cat, 1910; The Street of Seven Stars, 1914; The Amazing Interlude, 1917; and Dangerous Days, 1919, dealing with America during the Great War. Her plays include Double Life, 1907; Cheer Up, a farce, 1913; and others written in collaboration.

Ring (A.S. *hring*, circle). Circular band, usually of metal, worn on the hand. Great importance has always been attached to rings, which have been in use since remote times. Signet-rings are among the most ancient, bearing carved or incised symbols peculiar to the owner, which gave an impression in wax or clay equivalent to a signature. It is of this type that we read in the Bible and ancient chronicles as being used as tokens



Ring. Examples of finger-rings. 1. Etruscan; gold hoop with oval engraved stone. 2. Roman; gold octagonal hoop and garnet with intaglio. 3. Merovingian; gold set with garnets. 4. Scottish, 16th century; gold dated 1565 and engraved with the initials MH for Mary Queen of Scots and Henry Darnley, to whom it belonged. 5. French, 13th century; gold episcopal ring, with uncut sapphire. 6. English; gimmel ring set with jewels. This was the wedding-ring of Sir T. Gresham. 7. Italian, 16th century; gold set with jewels. 8. Anglo-Saxon; gold, probably an episcopal ring of Alhstan, bishop of Sherborne. 9. English, 18th century; gold signet engraved with coat of arms.

2-5 and 7-9, by courtesy of the Director, Victoria & Albert Museum, S. Kensington

of authority. The Egyptians, who possessed independent seals, also wore signet-rings, many of which had pivoted bezels, one side engraved with the hieroglyphic cartouche or signature, the other carved into the shape of the sacred scarab beetle, or other religious symbol. Some of these were adorned with coloured enamels, coloured glass, or precious stones. Another practical form of this article was the bow-ring, worn on the thumb with a sloping part to protect the ball of the thumb from the rebound of the bow string.

Early types of rings were made in the shape of three part circles, the ends fitting into the bezel, or with small end rings to hold the pivoted bezel. Others are plain bands, flat or rounded. In the more elaborated types we have the hoops of varied styles attached to the flattened front part, the bezel or chaton, also called a collect when encircling a cameo or a precious stone. Twin (gimmel) rings, consisting of two circlets interlocked, as well as trick rings consisting of two, three, or more separate circlets which joined up when placed on the finger, but fell apart when taken off, are found among ancient jewelry.

Use in Classic Times

In early days Greeks made little use of rings. In republican Rome rings were plain; the equestrian order wore them made of iron, but these later became tokens of the servile state. Under the emperors great extravagance was displayed in the matter of rings, both men and women wearing superb specimens enriched with carving, chasing, enamelling, cameos, intaglios, and precious stones. Some of the most beautiful were hollow, to contain poison, either for an enemy or

for self-destruction. Such rings persisted into the 18th century. Charm rings were in use among the Romans, as they had been with the Egyptians, and later with the Coptic and other Gnostics. In medieval times and long after, charm and magic rings were in high esteem, bearing mystic inscriptions and symbols. The precious stones themselves were deemed to be charms, each having a special attribute as a preservative against poisoning, the evil eye, casting of spells, and so on.

Betrothal and Marriage Rings

In ancient Rome a ring was given as a pledge of betrothal, and though this custom seems to have been the origin of the modern wedding-ring, it may still be traced in the common practice of giving a gem-ring when a marriage engagement is agreed upon. Another form of betrothal ring, common in Elizabethan and Stuart times, was the posy or poesy ring, the name being derived from the rhyming inscription cut upon it. Similar appeals for faithful love were once conveyed by rings given on the occasion of marriage.

Marriage rings were adopted by the Church from the pagan custom of placing a ring on the bride's finger, no doubt originally as a symbol of possession. Wedding-rings have nearly always retained the plain circle form of the old iron hoops. But it was otherwise with the Jews. Their marriage rings are heavy, elaborately carved, broad bands with inscriptions, and frequently possessing projecting bezels in the shape of miniature tabernacles. Certain of the ecclesiastical rings of office, bestowed on bishops, mitred abbots, cardinals, and popes, have this peculiarity of enormously projecting bezels.

chion cut gem, the flat ones occasionally incised. The gems were usually sapphires, the token of purity, though rubies (fiery glory), emeralds (tranquillity), and crystal (simplicity) are also seen. This symbolism of the above value of stones has come down to us in the natal stones, a special gem being assigned to each month, and alphabet rings, one stone or a variety being chosen to give the initial letter, or even to spell a name in full. A ring, the "marriage ring of England," is used in the coronation ceremony, and formerly contained a fine sapphire, said to have belonged to Edward the Confessor. The Doges of Venice wore rings of office, and these they cast into the Adriatic on Ascension Day of each year as a token of the marriage of the Republic to the Sea. (See Bucentaur.)

Devotional and Memorial

Devotional rings include those known as decade rings, the hoops adorned with ten knobs, for ten Aves, the bezel serving for the Paternoster. Others have hinged bezels, the gem stone concealing a sacred miniature, symbol, or inscription. Similar rings of secular nature have portraits or mottoes; among these may be classed the memorial rings for lost causes, the Stuart or Bourbon rings. Allied to these are the mourning rings; some having hair of the deceased daintily plaited or formed into conventional designs, placed under crystals or white sapphires; others are enamelled black, and bear portraits, appropriate emblems, or inscriptions. Attachments to rings are not uncommon. Some Roman rings had small keys projecting from the hoop flat against the finger: probably keys of treasure chests. In later times we see gems, miniature reliquaries, or charms,

Many of them are of such dimensions that they can have been used only on ceremonial occasions over gloves.

In the papal rings broad hoops support heavy projecting bezels, the shoulders and side adorned with sacred figures, symbols and heraldic shields, in the top a table or cabochon

pendant on chains from rings. Rings have been worn on all the fingers, including the thumb, which was much favoured among Asiatics and in Europe, especially in the 15th and 16th centuries. Ecclesiastical rings were early worn on the first finger of the right hand, then on the third of the left, the marriage finger, because it is supposed to communicate direct to the heart by an artery. The little finger of the right hand was chosen for the signet ring.

In occult and magical ceremonies, the use of the ring is of very ancient date and its origin is obscure. It has been suggested that it was an emblem of the sun, but it seems more probable that it represented the idea of binding or constriction. The necromancer stood within a ring drawn on the ground during his incantation, with the idea that he was thus enclosed against the assaults of evil spirits, who were unable to cross the boundary of the ring. Many of the earliest temples and meeting-places were built in the form of a circle. There is a fine collection of rings in the British Museum. See Circle; Gem; Jewelry; Memento Mori; Gnome-ornament; Symbolism.

G. C. Rothery

Bibliography. History and Poetry of Finger Rings, C. Edwards, 1855; Antique Rings and Gems, C. W. King, 1872; Finger Ring Lore, W. Jones, 1877; Finger Rings in the Brit. Museum, F. H. Marshall, 1907.

Ring and the Book, THE. Blank verse poem by Robert Browning, first published in 1868-69 in four volumes. The subject is that of a 17th century murder trial, as the result of which Count Guido Franceschini and four accomplices were executed in Rome, in 1698, for the murder of the child-wife of the count and of her putative parents. Having picked up in Florence an old volume in which the record of the trial was presented, the poet determined on the form of his work, which in its successive books gives the case from different points of view, with extraordinary psychological insight.

Ring Bolt. Bolt with a hole through the head through which a loose ring is passed. Ring bolts are largely used for embedding in masonry or bolting into timber wharves and similar structures which are used for the purpose of mooring boats alongside.



Ring Bolt, for mooring boats



Ring Money. Examples of the ancient metallic currency, found in Ireland. Inset, piece of modern African ring, identical with the ancient shape

Ringbone. Disease of horses, a cause of lameness. It results from inflammation of the periosteal covering of the bone below the fetlock. It is usually set up by a blow, a kick, or some similar accidental cause. The seat of the disease is usually the short pastern bone known as the "corona." Ringbone is commonest in heavy horses, or animals with upright pasterns. It is rare in blood stock. For severe cases it is necessary to resort to blistering, firing, or unnering. In all cases special shoeing is essential.

Ring Dove (*Columba Palumbus*). Name sometimes given to the common wood pigeon. The



Ring Dove. Ringed turtle dove, carrying a black ring

largest member of the tribe in Great Britain, it is so named from the patch of white on either side of the neck, and occurs throughout the country and is common in the London parks and squares. It is a voracious eater, and a most serious pest to the agriculturist. See Pigeon.

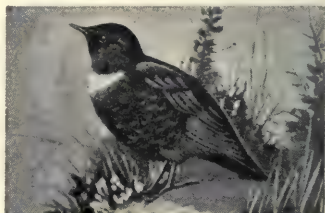
Ringkjöbing OR SLAVNING FIORD. Large lagoon in W. Jutland, Denmark. It is 28 m. long and has a width of 9 m. At its head is the little town of Ringkjöbing, with a pop. of 3,000.

Ring Money.

Primitive form of metallic currency used in ancient Egypt, Gaul, Ireland, Norway, etc., and still used in some parts of Africa. It arose from and is often indistinguishable from golden articles of adornment worn by barbaric peoples. Probably the custom arose among savage people from that of wearing all their wealth in the form of ornaments. In Egypt, ring money circulated by weight, and much of the ring money still used in Africa is of Birmingham manufacture. Many examples of ring money have been found in the British Isles. See Coins; Money; Numismatics; consult also The Origin of Metallic Currency, W. Ridgeway, 1892.

Ringnes. Two islands in the Arctic Ocean, Brit. N. America. They are situated between Axel Heiberg Land and Prince Gustav Adolf Sea. The easternmost is called Amund Ringnes Island, while that to the W. is known as Ellef Ringnes Island.

Ring-Ouzel (*Turdus torquatus*) OR MOUNTAIN BLACKBIRD. European song-bird of the thrush family. Its feathers are black with a narrow edging of greyish white, and it has a white patch on the throat. It arrives in England in April and breeds in a few districts in Devonshire, Derbyshire, and the N., nesting often in a tuft of heather. It is common



Ring-Ouzel or Mountain Blackbird, a European song-bird

throughout the mountainous regions of Central Europe and Scandinavia. See Bird; Thrush.

Ring Snake. Alternative name for the common grass snake (*g.v.*).

Ringwood. Market town of Hampshire, England. It stands on the Avon, 24 m. from Southampton and 103 m. from London, with a station on the L. & S.W. Rly. At the end of the New Forest, it is a tourist centre and is noted for its ale. There are a few manufactures, especially woollen gloves. The chief building is the church of SS. Peter and Paul, largely rebuilt in the 19th century. There is a town hall and a corn exchange. Ringwood is said to have been founded by the Romans as a military post. Market day, Wed. Pop. 5,000.

Ringworm OR **TINEA.** Affection of the skin due to the growth of a fungus, several forms of which are recognized. The common ringworm of Great Britain is most often seen in children between the ages of 5 and 15. It occurs most frequently on the scalp, starting as a small, scaly spot, which gradually enlarges and becomes almost denuded of hair. The disease may last for years if not treated. Various ointments may be applied, but by far the best treatment is the skilled application of X-rays. Ringworm is contagious, and children suffering from it should be separated from other children.

Rink. Place where races are run or games played, a variant of ring. It has chiefly come to be used for an artificially prepared sheet of ice, where skating can be carried on under cover. It refers also to a floor of wood or asphalt whereon roller skating is practised, and to the building itself. In curling, the rink is the stretch of ice marked out for the game. See Curling; Roller Skating; Skating.

Rinuccini, GIOVANNI BATTISTA (1592-1653). Italian prelate. Born in Rome, Sept. 15, 1592, after a course of universal study he entered the Church, and being of good family soon obtained promotion. Gregory XV made him his chamberlain, and in 1625 he was elected archbishop of Fermo. In 1645 Pope Innocent X sent him to Ireland, where he was soon mixed up in the intrigues of the Civil War. Ormonde, the royalist leader there, signed a treaty with the English parliamentarians, but, influenced by Rinuccini, many of the Roman Catholics refused to accept it, and warfare continued. The plans of the papal envoy, however, did not work out well, and in 1649 he returned to Italy. He died Dec. 5, 1653.



, Ringwood, Hants. Market Place and Town Hal.

Riobamba OR **BOLIVAR.** City of Ecuador, capital of the prov. of Chimborazo. It stands near the Riobamba river, 85 m. E.N.E. of Guayaquil on the rly. between that town and Quito. Situated near the extinct volcano Chimborazo, at an alt. of 9,100 ft., it has a ruined Inca palace, a cathedral, a seminary, and national college. One of the most ancient and historic towns of the republic, it was destroyed by an earthquake in 1797, and was entirely rebuilt on a new site 3 m. away. Pop. 18,000.

Rio Cuarto. Town of Argentina, in the prov. of Córdoba. It stands on the Rio Cuarto, on the Trans-Andean Rly., 360 m. W.N.W. of Buenos Aires. A garrison town, it has an arsenal, and is of military importance. The centre of a fruit-growing region, it is a market also for the stock reared in the district. Pop. 30,000.

Rio de Janeiro. State of Brazil, bounded on the S. and E. by the Atlantic Ocean. Mountainous in the interior, the surface slopes towards the coast. The Serra do Mar and the Organ Mts. are the dominating ranges. The state is watered by the Parahyba and smaller rivers, and is served by several rlys. On the coast the heat is oppressive, and malarial fevers prevail. The chief products are coffee, sugar, cacao, rice, maize, fruit, manganese, and indigo. The forests of the interior yield valuable wood. Since the Great War numerous factories have sprung up. The capital is Niteroy. Area 49,560 sq. m. Pop. 1,446,000.

Rio de Janeiro (São Sebastião do Rio de Janeiro). Federal capital of the United States of Brazil. It lies on the W. shore just inside the entrance of the bay of Guanabara

(commonly known as the bay of RiodeJaneiro). The name commemorates its discovery on Jan. 1, 1502. There is, however, no river of that name, the bay being a wide lagoon fed by small streams from the surrounding mountains. At its entrance, which is overshadowed by the famous Sugar Loaf Mt., the channel is less than a mile wide; but at its widest points the bay is 20-30 m. across. The whole forms one of the finest natural harbours in the world and is an important port of call.

The second city in importance and population of S. America, ranking next to Buenos Aires, it is situated in the S.E. corner of the Federal District, which has an area of 431 sq. m. The old city, which is now the business centre, lies between the spurs of the surrounding mountains. It was formerly very insanitary, but drainage improvements have made it at least as healthy as most S. American capitals. About 1905, when Dr. Passos was prefect of the Federal District, sweeping improvements were made in the construction of the city. Numbers of the small, narrow streets were pulled down, and in their place wide avenidas were constructed. Notable among these was the Avenida Central, now known as the Avenida Rio Branco (renamed after the famous minister for foreign affairs), which is now the main artery of the city. This avenida, which is lined with splendid modern buildings, is continued along the shore of the bay, past the residential suburbs of Botafogo and Gloria, by the Avenida Beira Mar, which is constructed with a sea-wall of granite



Rio de Janeiro. Map of the environs of the city, showing the area administered as the Federal District



Rio de Janeiro. Plan of the central districts of the capital city of the United States of Brazil

and laid out in gardens and walks to an extent of 4 m.

Rio de Janeiro has many fine ancient buildings, *e.g.* the Candelaria church, while the Monroe palace, national library, and national museum are excellent specimens of modern architecture. The national telegraph office, which was formerly the royal palace, is a notable edifice. The Carioca aqueduct, in which the water of Rio is brought, extends from the mountains of Santa Thereza to those of Santo Antonio, and has been described as the only fine specimen of architecture left by the Portuguese in Brazil; it was completed in 1750. The hospital, Santa Casa da Misericórdia, is one of the largest institutions in the world. There are schools of medicine and law, a polytechnic school, conservatory of music, and various academies for art, science, and commerce. The exchange and government offices are imposing structures. In the newer section of the city the streets are fairly broad and lit by electric light.

There are many squares and public places, such as the Praça do 15 de Novembro, the botanical gardens, the Passeio Publico, and the Praça Tiradentes, adorned with a statue of Dom Pedro I.

Extensive harbours have been constructed. The principal export is coffee; imports are cereals, coal, and manufactured goods. It is estimated that the population of the Federal District, which is administratively co-extensive with Rio, is 1,300,000.

Rio de Janeiro was discovered by the Portuguese and Italian navigators Gonçalves and Vespucci in 1502. A settlement was made there in 1504 by Coelho, a follower of Gonçalves, but it was destroyed by the Tamoyo Indians soon afterwards. In 1555 a French nobleman, Villegaignon, established a settlement at Rio on the mainland and the island of his name, but it was taken by the Portuguese governor, Mem de Sá, in 1568, who then established the town of São Sebastião do Rio de Janeiro on the Morne do Castelo. The town was bombarded by the French admiral, Duguay-Trouin, in 1711. Rio de Janeiro took the place of Bahia as capital of Brazil in 1762, and became the capital of the empire of Brazil in 1822. In 1889, after the proclamation of the republic, it was made, with the surrounding territory, federal district and federal capital of the republic. It is governed by a prefect appointed by the government and assisted by a municipal

council. See *The Beautiful Rio de Janeiro*, A. G. Bell, 1914.

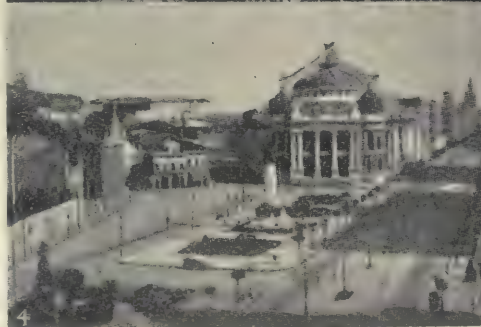
Rio de Oro (Sp., river of gold). Spanish colony along the coast of W. Africa, S. of Morocco. The country is mainly desert, and forms an E. extension of the Sahara, and the climate is exceedingly hot. The territory is administered by the governor of the Canary Islands; Villa Cisneros is the capital. Its area is 73,000 sq. m. Pop. 12,000.

Rio Grande. Name of two rivers of Brazil. One rises in the mts. on the W. border of Bahia State, flows N.E., and joins the São Francisco at Barra. From the N. it receives several affluents. Its length is about 300 m., and it is navigable for 130 m. The other rises in the Serra de Mantiqueira in the S. portion of the state of Minas Geraes, flows along the frontier of Minas Geraes and São Paulo, and unites with the Paranaíba to form the Paraná after a course of about 440 m.

Rio Grande. River of U.S.A. In full, Rio Grande del Norte or Rio Bravo del Norte. It rises in the San Juan Mt., S.W. Colorado, and flows S. and S.E., separating Texas from Mexico, to the Gulf of Mexico. Owing to the aridity of the climate and the great quantities of water abstracted for irrigation, during part of the year it is almost dry for considerable distances either side of El Paso. Its chief affluent is the Rio Pecos. Its length is 1,800 m., of which 450 m. are navigable for small vessels.

Rio Grande do Norte. State in N.E. Brazil. It lies between Ceará and Parahyba, sloping N. and N.E. to the Atlantic. Mountainous and not well watered, there is a level tract near the coast. The climate is hot and dry, and, on the whole, equable and healthful. It produces cotton, cattle, sugar, various kinds of valuable timber, cochineal, coffee, wax, rubber, tobacco, drugs, salt, and fish. The capital is Natal. Its area is 22,190 sq. m. Pop. 552,000.

Rio Grande do Sul. Southernmost state of Brazil. Bounded on the N.W. by Argentina and on the S.W. by Uruguay, its coasts on the Atlantic Ocean are low and almost filled with lagoons (*see* Lagoa dos Patos). Largely grass land, the chief occupation is the rearing of cattle, horses, and mules. Vines, rice, tobacco, coffee, vegetables, maté, sugar, and cereals are cultivated, and linen, woollens, and soap are manufactured. Wolfram is mined, and copper, gold, amethysts, agates, and coal are found. The capital is Porto Alegre (*q.v.*). Its area is 91,310 sq. m. Pop. 2,139,000.



1. Praça do 15 de Novembro; left is seen the Ministry of Transport and Public Works; right, the cathedral.
2. City and bay, with the Sugarloaf, from Corcovado.
3. Palm avenue, in the Botanical Gardens. 4. Praça

Marechal Floriano, with the Municipal Theatre and the Avenida Rio Branco. 5. Avenida Rio Branco. 6. General view from the docks, showing, right, the church of Nossa Senhora da Candelaria (our Lady of the Lamps)

RIO DE JANEIRO: SCENES IN THE PICTURESQUE CAPITAL OF THE UNITED STATES OF BRAZIL

Rio Grande do Sul. Seaport town of Brazil, in the state of Rio Grande do Sul. It stands at the mouth of the Lagoa dos Patos, and is connected by rly. with Pelotas and the interior, and with Porto Alegre by steamer. Low-lying, on a sandy plain, it has a large harbour, and exports dried meats, hides, hair, tobacco, maté, etc. Tanning and brewing are important industries. Pop. 35,000.

Rioja. Spanish wine produced in La Rioja (*q.v.*) dist., Old Castile. A fine, red wine of a heavy, claret type, it is characterised by full body, slight ferruginous flavour, fair alcoholic strength, purity, and cheapness. Exported from Bilbao, it is called Spanish Burgundy.

Riom. Town of France. In the dept. of Puy-de-Dôme, it stands on the left bank of the Ambère and is a junction of the Lyons rly., 8 m. N. of Clermont-Ferrand. The church of S. Chapelle, built 1382-38, was formerly the château of the dukes of Auvergne. The 15th century church of Notre-Dame-du-Marthuret has a fine Virgin with bird on the portal. There are tobacco and linen factories and a trade in corn, wines, etc. The town contains many fine houses of the 15th and 16th centuries. Pop. 10,600.

Rio Muni. Alternative name for Spanish Guinea (*q.v.*).

Rion. River of Transcaucasia, the ancient Phasis. Rising on the S. slope of the main Caucasus range, it falls into the Black Sea at Poti, after a course of 200 m. It was famous in antiquity from its connexion with the Argonautic expedition. See Georgia.

Rio Negro. Territory of Argentina, in Patagonia. Stretching from the Andes to the Atlantic, where it is indented by the Gulf of San Matias, it is bounded on the N. by the Rio Colorado and S. by Chubut Territory. It is traversed by the Rio Negro and the rly. from Bahia Blanca to Neuquen. Mostly plateau, with a dry and healthful climate, the soil is fertile when irrigated. It produces cereals and alfalfa, and raises large quantities of stock. The capital is Viedma, situated on the Rio Negro near the coast. Area 79,805 sq. m. Pop. 46,000.

Rio Negro. Department of W. Uruguay. It is bounded on the W. by the river Uruguay and S. by the

Rio Negro. The principal occupations are agriculture and stock-raising. The capital is Fray Bentos (*q.v.*). Area 3,269 sq. m. Pop. 37,800.

Riot (*M.E. riote*; *cf. Ital. riotta, quarrel*). Term used broadly for revelry, tumult, or disorderly proceedings. In English law, a riot is defined as a violent disturbance of the peace by not less than three persons, who, having gathered together without lawful authority, and having agreed among themselves to withstand opposition, execute or begin to execute a common purpose turbulently to the terror of the people or of at least one person of reasonable firmness and courage.

Any citizen may be called upon to help in suppressing a riot. Under the Riot Damages Act, 1886, the police authorities of the district may be sued for damage done during the riot. See Sedition.

Riot Act. Act passed in 1715, which gives power to magistrates to apprehend as felons, persons who to the number of 12 or more assembled refuse to disperse within an hour after the reading of proclamation bidding them to do so. The Act, further, indemnifies any who at the request of the magistrate assist him in carrying out the law. This indemnification in effect gives magistrates power to employ military to disperse a mob. The Act was originally prompted by fears of Jacobite risings.

Rio Tinto, MINAS DE (Sp. coloured river mines). Town of Spain, in the prov. of Huelva. It stands near the source of the river Tinto, 52 m. by rly. N. of Huelva. The centre of one of the most celebrated copper-mining regions of the world, Rio Tinto and the surround-

ing villages are peopled by some 10,000 miners. The mines, known to the Carthaginians, and worked by the Romans, yield over a million tons yearly of iron pyrites containing copper ore and sulphur.

R.I.P. (*Lat. Requiescat in pace*). Abbrev. for "May he (or she) rest in peace"; *Requiescant in pace*, "May they rest in peace."

Riparian Owner (*Lat. ripa, bank*). In law, one whose land is part of the bank of a stream or river. In a non-tidal river, or in a tidal river above the limit to which the tide reaches, as a rule the bed of the river belongs to the riparian owner as far as the middle. This constitutes the riparian owners, in effect, the owners of a river or stream, and the public have, as a rule, no rights of navigation, or of fishing, or bathing.

Ripieno (*Ital., additional*). In music, a term in 17th and 18th century scores designating those instruments which were not to be played in accompanying solos, but only in full passages.

Ripley. Urban dist. and market town of Derbyshire, England. It is 10 m. from Derby, with a station on the Mid. Rly. All Saints Church



Ripley, Yorkshire. Parish church of All Saints

Frith

is a modern building. There are some textile manufactures and around are coal mines and ironworks. Ripley was made a market town in the 13th century. Market day, Sat. Pop. 11,800.

Ripley. Village of Surrey, England. It is 5 m. from Woking. Being on the main road from London to Portsmouth, several miles of which are sometimes called the Ripley Road, it was an important place in coaching days. Its church, S. Mary's, has some interesting features.

Ripley. Village of Yorkshire (W.R.), England. It stands on the Nidd, 3 m. from Harrogate, with a station on the N.E. Rly. It has a fine church, dedicated to All Saints, in which are memorials to the Ingilby family. Ripley Castle dates from the 16th century, but has been modernised. Pop. 250.



Ripley, Yorkshire. Castle, built in the 18th century, where Cromwell stayed before the battle of Marston Moor

Ripon. City and mun. borough of Yorkshire (W.R.), England. On the Ure, it is 214 m. from London



Ripon arms

and 24 m. from Leeds, and is served by the N.E. Rly. The chief building is the cathedral, which replaced an earlier one, of which the crypt remains. Its erection occupied about three centuries, and consequently it displays all styles of architecture, from the Norman apse through the Transitional transepts to the Perpendicular work in the choir and elsewhere. It was restored in 1862-72. The chapel of the hospital of S. Mary Magdalen is a Norman building. The city has some old almshouses, including the hospitals of S. John the Baptist and S. Anne, a modern town hall, and a museum. The episcopal palace is just outside the town. There is a lofty obelisk in the market place. Ripon is a spa, having baths and a pump room. It has a trade in agricultural produce and manufactures of leather goods. Near are Studley Royal (q.v.) and Fountains Abbey (q.v.).

Ripon grew up around an abbey founded in the 7th century, Wilfrid, to whom the cathedral is dedicated, being the first abbot. It was soon made a corporate town, and had fairs and markets which, until 1880, belonged to the archbishop of York or the ecclesiastical commissioners. It became famous for its cloth, and later for the quality of its spurs. The chief official was known until 1604 as the wakeman, and a horn is still blown in the market square every evening at 9 o'clock. It was made the seat of a bishop in 1836, the cathedral having previously been a collegiate church. Ripon was separately represented in Parliament until 1885. The treaty of Ripon was signed here between Charles I and the Scots in 1640. Pop. 8,200.

Ripon, FREDERICK JOHN ROBINSON, 1ST EARL OF (1782-1859). British statesman. Born in London, Oct. 30, 1782, the second son of the second Baron Grantham, he was educated at Harrow and Cambridge. He early took up a



After Sir T. Lawrence

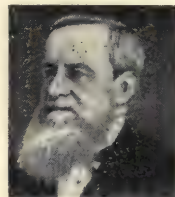


Ripon, Yorkshire. West front of the cathedral

political career, becoming M.P. for Carlisle in 1806, and in 1807 for Ripon, which he represented for nearly 20 years. He filled many public offices, being president of the board of trade, 1818-23; chancellor of the exchequer, 1823-27, in which capacity he was nicknamed by Cobbett "Prosperity Robinson"; secretary of state for the colonies, 1827; first lord of the treasury, 1827-28; secretary of state for the colonies, 1830-33; lord privy seal, 1833-34; president of the board of control, 1843-46. He was created Viscount Goderich in 1827 and earl of Ripon in 1833. He died Jan. 28, 1859.

Ripon, GEORGE FREDERICK SAMUEL ROBINSON, 1ST MARQUESS OF (1827-1909). British statesman. Born Oct. 24, 1827, when his father, Viscount Goderich, later earl of Ripon, was prime minister, he was educated privately. His early opinions were liberal, and these were deepened by his friendship with Charles Kingsley, Thomas Hughes, and other Christian socialists. In 1852 he entered parliament as M.P. for Hull, and he held other Yorkshire seats until 1859, when he succeeded his father as earl of Ripon and his uncle as Earl de Grey. In 1859 also he became under-secretary for war under Palmerston, and he held minor office until 1863.

Earl de Grey and Ripon then entered the Liberal cabinet as secretary for war, and from that



Ripon

time he was one of the leaders of his party. In 1866 he was secretary for India, and in 1868 Gladstone made him lord president of the council.

He was chairman of the commission appointed to settle the Alabama dispute, and his success therein was recognized when he was made a marquess in 1871. He resigned his cabinet office suddenly in 1873. Ripon's next important post was that of governor-general of India, which he held from 1880 to 1884, a difficult time owing to troubles in Afghanistan. In 1886 he was first lord of the admiralty; from 1892-95 he was secretary for the colonies, and from 1905-8 lord privy seal and Liberal leader in the Lords. He retired in 1908, and died at Studley Royal, near Ripon, July 9, 1909. Since 1873 Ripon had been a Roman Catholic. His son, Frederick (1852-1923), a noted shot, long known as Earl de Grey, succeeded him. See Studley Royal; consult also Life, L. Wolf, 1921.

Ripon Falls. Falls on the river Nile. Discovered by Speke on July 28, 1862, they consist of three distinct falls near the beginning of the Nile where it issues from Victoria Nyanza. Here the rapids prevent navigation, but a rly. was built, 1912-13, from Juba to Namasagali (61 m.) to afford direct communication with Lake Choga (Kioga) and the Victoria Nile.

Ripperda. JOHANN WILHELM, DUKE OF (1680-1737). Dutch adventurer. Born at Groningen, he entered the service of Philip V of Spain in 1715, and was rewarded for his success in negotiating the alliance of 1725 with Austria by a dukedom. On his disgrace in 1726 he escaped to Holland, and then to Morocco, and induced the sultan Muley Abdallah to attack Spanish territory in Africa. The expedition which he commanded under the name of Osman Pasha failed, and he died at Tetuan, Nov. 2, 1737.

Ripple Marks. Name given to the undulatory marks seen on the sands of the seashore and of the desert, etc. These ripple marks are caused by air action chiefly, the air being set in wave motion by the movements of the sea water or by other causes, e.g. the inequalities of the land surface over which the water is moving.

Rip van Winkle. Hero of a story in Washington Irving's *The Sketch Book*, 1819-20. Inhabitant of a village in the Catskill Mts., New York, he falls into a 20 years' sleep, and wakes to find everything changed and himself well-nigh forgotten. The story was long popular in the form of a drama, first performed in 1828. There have been several revivals, including Boucicault's version, with J. Jefferson in the title-rôle (Adelphi, 1865), an anonymous version with Beerbohm Tree in the title-rôle (His Majesty's, 1900), and Austin Strong's version with Cyril Maude as Rip (Playhouse, 1911). H. B. Farnie and R. Planquette produced a comic opera, with Fred Leslie as Rip, at the Comedy Theatre in 1882.

Risaldar. Commissioned officer (native) in the Indian cavalry. He corresponds to the subhadr in Indian infantry, and may be promoted to risaldar major.

Risca. Urban dist. of Monmouthshire, England. It stands on the Ebbw, 6 m. from Newport, with a station on the G.W. Rly. There are chemical and tinplate works, and all around are coal mines. Pop. 14,000.

Risdon. Town of Tasmania. It is situated near Hobart. Here is one of the largest zinc-producing plants in the world, and sufficient hydro-electric power is supplied by



Ripon Falls, Central Africa. Falls on the Nile, as it leaves the great lake, Victoria Nyanza

the Tasmanian government for the production of 50,000 tons of zinc annually from zinc concentrates and slimes, as well as the production of considerable quantities of sulphuric acid. At the last census the pop., which has since rapidly increased, numbered 111.

Rise. Geographical term meaning an elevation, ridge, or plateau rising above the general level of the ocean floor. An excellent example of a rise is the long and irregular elevation which longitudinally traverses the whole length of the Atlantic Ocean, and divides it into two deep basins. In the N. Atlantic it is called the Dolphin Rise, in the S. Atlantic the Challenger Rise. The Azores, Ascension, and Tristan da Cunha islands stand upon the Atlantic rise. See Ocean.

Rise. In mining, name of a particular kind of shaft. Small shafts are excavated from one floor level of the mine to the one next above, and such a shaft is called a rise, as distinguished from a winze (q.v.). It may be vertical or inclined; its sides are timbered. A timber partition goes down the middle, forming two compartments, one with ladders for the miners and the other for the removal of ore or waste. Larger rises, divided into three compartments, are often constructed. See Mining.

Rishi. In Oriental mythology, title given to the seven mind-born sons of Brahma, the seers or sages to whom were revealed the Vedas. The term is also applied to other ancient poets and men of special sanctity. In astronomy, the word was used of the stars forming the Great Bear.

Rishton. Urban dist. of Lancashire, England. It is 3 m. from Blackburn, with a station on the L. & Y. Rly. Paper and fire-bricks

are made, and in the vicinity are coal mines, cotton mills, and stone quarries. Pop. 7,400.

Rising Sun. ORDER OF THE.

Japanese order, also known as the Eastern or Morning Sun. It was instituted in 1875, with eight grades, as a reward for military and civil services. The badge is a red sun emitting 32 white rays, and the ribbon is white with red borders.



Rising Sun. Badge of the Order

Risk (Fr. *risque*, peril). Term used in various connexions, especially in insurance and commerce. There are few risks against which insurance cannot be obtained on payment of a premium. Extraordinary or fantastic risks are not usually accepted by the ordinary insurance companies, this class of business being undertaken by Lloyd's (q.v.). Where the carriage of goods is concerned, the rates charged by rly. companies and other carriers are often appreciably reduced, if the owner takes the risk of loss or damage in transit. The word risk was originally a seafaring term, cf. Span. *arriesgar*, to run on the rocks, i.e. into danger. See Insurance; Lloyd's; Railways.

Rispetti (Ital. *rispettoso*, respectful). Originally, Tuscan folk songs conveying respectful salutations to the beloved one. The characteristic form is a verse of four lines rhyming alternately, followed by a rhyming couplet, called the *ripresa*, which develops some conception or fancy, or word or phrase, of the third or fourth line of the preceding quatrain. A variant form corresponds to the ottava rima of Italian literature, consisting of octaves composed of six lines alternately rhyming, followed by a rhyming couplet.

Rissole. Word borrowed from the French, and meaning a cake of meat or fish, minced and fried with egg and bread-crumbs.

Ristich. JOVAN (1831-99). Serbian statesman. Born at Kragujevatz, Oct. 27, 1831, he entered the diplomatic service, and, as chief of the mission sent to Constantinople in 1860, succeeded in preventing a definite rupture with Turkey, and ultimately secured the withdrawal of the Turkish forces from Serbian fortresses. He was a member of the council of regency during the minority of Prince G. (afterwards King) Milan, and for a brief period (1872-73) prime minister. Ristich was a partisan of Russian intervention on behalf of Serbian

independence, while the prince in 1873 placed his hopes on Austria, and when Serbia had declared war on Turkey against Russian advice, he became the recognized leader of the Liberal party, and was again called to power in 1876. In 1878 he represented Serbia at the Berlin congress. Ristich was a member of the council of regency during the minority of King Alexander, and when this prince prematurely announced his majority by arresting his regents, Ristich retired. He died at Belgrade, Sept. 4, 1899.

Ristori, ADELAIDE (1822-1906). Italian actress. Born at Cividale del Friuli, Jan. 30, 1822, she made her earlier successes in comedy, but achieved her first triumph in Rome in 1849 as the heroine of Alfieri's *Myrrha*. In 1855 she was favourably received in Paris, where Rachel's



Adelaide Ristori,
Italian actress
Elliott & Fry

supremacy seemed unquestioned, as *Myrrha*, *Francesca da Rimini*, and *Mary Stuart*, and was also seen in the *Medea* and *Beatrix of Legouv  *. She acted frequently in London, making her d  but as *Medea* at The Lyceum, June 4, 1856, and playing *Lady Macbeth* at Drury Lane, July 3, 1882. She died in Rome, Oct. 9, 1906.

Risus Sardonius. Spasm of the facial muscles producing the appearance of a sardonic grin. It occurs in convulsive diseases as tetanus and in poisoning by strychnine.

Rita. Pen-name of Mrs. W. Desmond Humphreys, British author. She was born in Inverness-shire, her maiden name being Gollan, and educated in Sydney, N.S.W. Her numerous stories, many of which have enjoyed wide popularity, include *Dame Durden*, 1883; *Peg the Rake*, 1894; *A Jilt's Journal*, 1900; *The Masqueraders*, 1904; *Jill-all-Alone*, 1914; *The Ink-Slinger*, 1915; *The Iron Stair*, 1916; and *The Philanthropic Burglar*, 1919.

Ritardando or **RITENUTO** (Ital., holding or held back). Musical terms of almost identical meaning, indicating that the time is to be slackened. The usual abbrev. is *rit.*

Ritchie, ANNE ISABELLA, LADY (1838-1919). British author. Born in London, the eldest daughter of



Lady Ritchie,
British author

W. M. Thackeray, she was educated in Paris and Kensington. She was Thackeray's closest companion until his death, and contributed to a library of her father's novels a number of invaluable personal reminiscences. In 1877 she married Sir Richmond Ritchie (d. 1912). Lady Ritchie died Feb. 26, 1919. Among her novels are *The Story of Elizabeth*, 1863; *Old Kensington*, 1873; and *Mrs. Dymond*, 1885. Her introductions to *Cranford* and *Our Village*; her study of *Mme. de S  vign  *, 1881; *A Book of Sibyls*, 1883; her *Lord Tennyson and his Friends*, 1892; and her *Chapters from some Memoirs*, 1894, abound in delicate revealing touches in biography.

Ritchie, CHARLES THOMSON RITCHIE, 1ST BARON (1838-1906). British politician. Born at Dundee, Nov. 19, 1838, the son of a merchant, he was educated at the City of London School. He began his business career in London, soon becoming a partner in his father's firm. In 1874 he entered Parliament as M.P. for the Tower Hamlets, and as a Conservative did a good deal for the interests of the working classes.



1st Baron Ritchie,
British politician

In 1885 he was made financial secretary to the admiralty, and in 1886 he became president of the local government board; as such he was responsible for the Act creating county councils, and he held that position until 1892. He was without a seat in Parliament until 1895, when he became M.P. for Croydon and president of the board of trade, where he was responsible for initiating the work of that department in settling labour disputes. In 1900 Ritchie became home secretary, and 1902 chancellor of the exchequer. In his budget of 1903 he took off the existing duty of 1s. a quarter on corn; this gave offence to the tariff reformers, led by Joseph Chamberlain, who resigned, as also did Ritchie. In 1905 he was made a baron, and he died Jan. 9, 1906. His elder son Charles (b. 1866)

succeeded him in the title. He became chairman of the Port of London Authority, 1925.

Ritchie, HENRY PEEL (b. 1876). British sailor. Born in 1876, he entered the navy, becoming lieutenant of the *Sans Pareil* in 1903, in which year he was commended by the admiralty for gallantry in attempting to save the



Henry P. Ritchie,
British sailor

life of a sea-man. He commanded the *Goliath* in the early months of the Great War, and distinguished himself in the operations against *Dar-es-Salaam* (q.v.), German E. Africa. He was awarded the second naval V.C. of the war for bravery on Nov. 28, 1914. He led a landing-party to search the place and demolish certain buildings, and while engaged in these operations was severely wounded several times. He retired from the navy in 1917.

Rite (Lat. *ritus*, custom). Religious act or ceremony performed according to established custom or precept. The term is also used of the general body of services used by a church or group of churches, e.g. the Byzantine Rite. In the R.C. Church, the congregation of rites regulates the general uniformity of practice in matters of divine worship, although making provision for national divergencies. It also decides causes of beatification and canonisation. The congregation was established by Pope Sixtus VI. See Liturgy.

Ritornello (It., a little return or repeat). A short strain of instrumental music. Originally it signified the music played between the scenes of an opera after the style of an intermezzo, but subsequently it meant the instrumental symphonies in a song when the voice was silent. It is still used in connexion with an old form of Italian verse, composed of stanzas of three lines in which the first and the last rhyme.

Ritschl, ALBRECHT (1822-89). German theologian. Born in Berlin, March 25, 1822, he became professor extraordinary of theology at Bonn in 1852. He removed in 1864 to G  ttingen, where he occupied a similar position for the rest of his life. In



Albrecht Ritschl,
German theologian

the early part of his career he was much influenced by Baur, but later the teachings of Lotze led him to modify his views. He belonged to the Neo-Kantian school of thought, which, in view of the generally materialistic attitude of German scientists, was disposed to regard the thing-in-itself as supplying a way of escape for those who sought a ground of faith beyond the bounds of human knowledge. He regarded such questions as the existence of God and the immortality of the soul as not being of the essence of theology, which should concern itself rather with the education of the soul in accordance with the teachings of the Bible. He was the author of *Theology and Metaphysics*, and died March 20, 1889.

Bibliography. The Ritschlian Theology, J. Orr, 1897; The Ritschlian Theology, A. E. Garvie, 1899; Ritschlianism, J. Orr, 1903; Faith and Morals: Faith as Ritschli Defined It, W. Hermann, Eng. trans. 1904.

Ritual (Lat. *ritus*, a rite). Name given to forms or ceremonies used in public worship. Ritual is found in every type of religion. It serves two purposes: (1) to express the devotion of the worshippers towards the object of their worship; (2) to illustrate or convey the message or teaching of the God who is worshipped to the minds of the worshippers. Many forms are used in ritual, e.g. an established order of prayer, the singing of hymns, the vestments of the clergy, the use of incense, etc. See Oxford Movement.

Ritualism. System of conducting worship according to a ritual. It has come to be used, however, usually in a derogatory sense, of the High Church or Tractarian movement in the Church of England. The Oxford movement led many clergymen to pay greater attention to ceremonial in worship, and altar lights, vestments, incense, etc., were introduced in many churches. These were authorised, it was urged, by the ornaments rubric of the Prayer Book, which prescribed the use of such ornaments as were in use in the second year of King Edward VI (1548), but many churchmen objected very strongly to them, as savouring of Roman Catholicism, and in several cases legal proceedings were taken. The most famous was when Edward King, bishop of Lincoln, was put on his trial. A royal commission inquired into this subject in 1867, and in 1874 was passed the Public Worship Regulation Act, directed against ritualistic practices. In 1906 a



Riva, Italy. The town and northern end of Lago di Garda

royal commission on ecclesiastical discipline made further recommendations for checking excessive ritual. See Church of England; Lincoln Judgement; Oxford Movement; Pusey, E. B.

Riva. Town of Italy, in the Trentino. It occupies a picturesque situation at the base of the precipitous Rocchetta, 4,976 ft., on the shore of Lago di Garda, 10 m. W.S.W. of Rovereto. The Palazzo Pretorio, built by the Scaligers in 1370, is used as a law court. The 12th century castle of La Rocca is used as a barracks. Pop. 4,000.

Rivadavia, BERNARDINO (1780-1845). Argentine statesman. In 1826 he was chosen president of



Bernardino Rivadavia, Argentine statesman

the new confederation. In the following year he resigned, and he died in exile at Cadiz.

Rivals, THE. Five-act comedy by R. B. Sheridan, produced at Covent Garden Theatre, Jan. 17, 1775. Badly received at first, it soon became a triumphant success, and remains among the most popular of purely English comedies. Its author's first play, written when he was only 23, the easy satirising of foibles of contemporary character marked his innate genius. The scenes are laid in Bath, and several characters of the play have become familiar to all, e.g. Bob Acres and Mrs. Malaprop. The *Rivals* marks the close of the period of sentimental comedy.

Rive-de-Gier. Town of France. In the dept. of Loire, it stands on the Gier and the Canal du Gier or de Givors, 13 m. N.E. of St. Étienne. It has coal, iron, steel, and glass works, and there are silk factories. Pop. 15,700.

River. Channel by which the rainfall on the land reaches the sea or basins of inland drainage. A river system or drainage area

comprises the main river and its tributaries. The line bounding the drainage area is called the water divide or watershed.

Some rivers, especially those which flow through rainless areas and receive their water only from rains near their sources, are intermittent, and by excessive evaporation may cease to flow in their lower reaches. Most rivers have seasonal periods of flood, due either to heavy rainfall or to the melting of snows at their sources. Rivers in high latitudes freeze in winter, but an undercurrent generally remains in motion. When such rivers break up in spring there are heavy floods. In the N. hemisphere rivers flowing polewards are deflected by the rotation of the earth, and press against their E. banks; those flowing equatorwards press against their W. banks. The banks of a river are termed right and left, applied in the direction of flow. Drainage follows the natural slope of the ground, and valleys in nearly all cases are the work of the rivers themselves. In regions of soluble rock rivers sometimes flow beneath the ground.

River systems are not fixed, but are steadily changing and developing. Rivers which follow the natural slope of the ground are termed consequent rivers; their tributaries, which cut valleys quickly along relatively soft strata, are termed subsequent rivers. Rivers which flowed across a country before mountains were elevated, and where downward erosion has kept pace with the elevation, flow in gorges through mountain ranges; they are termed antecedent rivers. A river is always lengthening its course by eating backwards with its source streams; in this way one river may tap another, and by capturing its waters become rejuvenated.

A typical river shows three characteristic portions: (1) the torrential course; (2) the valley course; (3) the plain track. In its torrential course it flows down the

hillside in a narrow ravine as a mountain torrent much interrupted by falls. In the valley course the gradient is more gentle and the velocity of the stream less; the river is relatively easily deflected from its course by obstructions, and begins to wind or meander. Its destructive work is horizontal as well as vertical, the valley being widened by the destruction of the concave banks at the bends.

In its plain course the river has eroded downwards almost to sea level, and so has a gentle gradient and a low velocity. It meanders widely, but its work is mainly constructive in the formation of shoals, flood plains, and deltas. Many rivers have only a torrential course; in others the plain course has been drowned beneath the sea by depression of the land. In this case an estuary or firth is formed. In all its stages a river does transport work, but the amount of material that can be carried in suspension or rolled along the bed depends on the velocity. A great deal of matter is also carried in solution.

The annual flow of the Mississippi carries to the sea about 400,000,000 tons of solid matter, and about 80,000,000 tons of dissolved mineral salts. It is estimated that the destructive action of a river like the Mississippi lowers its whole basin on an average one foot in 6,000 years. Among the longest rivers of the world are the Nile, 4,400 m. long, the Mississippi-Missouri, 4,200 m., the Amazons, 4,000 m., the Yang-tse, 3,500 m., the Ob-Irtish, 3,500 m., and the Amur, 3,000 m. The speed of a river varies with the gradient. A torrential stream flows at 18 to 20 m. an hour; a moderate current is about one m. an hour. In flood time the velocity of a river is increased, very often with disastrous results, since the increased velocity makes the river change its course suddenly.

Navigable rivers are natural highways, and since their valleys are generally fertile they afford routes through densely populated regions. With the increased size of vessels only the lower courses of the largest rivers are navigable by ocean-going steamers, but river steamers of shallow draught ply on upper reaches. The head of navigation, which is often, but not always, the head of tidal influences, has determined the site of many great seaports like London and Glasgow.

Deltas frequently interfere with navigation from the sea, as in the Ganges, Mississippi, and Nile, three rivers with long navigable courses. The value of rivers as



River Clyde. Troops landing on V Beach, Gallipoli, from the British collier

lines of communication is reflected in the establishment of certain rivers as international waterways, e.g. Congo, Danube, Elbe, etc. Unnavigable rivers are often used for floating timber, as in Canada and Sweden. Rivers of high gradients, particularly if interrupted by falls, provide abundant water power, as in Norway, Finland, the United States, and elsewhere. Before the industrial revolution this located many industries in Britain, such as cutlery at Sheffield, and woollens at Galashiels. Rivers flowing through dry lands are valuable for irrigation purposes, as the Nile and the Euphrates. All production in these basins has always been based on irrigation. Rivers are also of great importance in connexion with the supply of water to towns. See Amazon; Canal; Delta; Mississippi; Nile; Physiography; Reservoir; Thames; Transport; Water Power; consult also River Development as Illustrated by the Rivers of N. America, I. C. Russell, 1909; The Work of Rains and Rivers, T. G. Bonney, 1912.

R. N. R. Brown

Rivera. Department of N.E. Uruguay. It is bounded on the N. by the Brazilian state of Rio Grande do Sul and S. by the dept. of Tacuarembó. The surface is undulating pasture land, supporting large herds of cattle. Gold is found, and cattle and animal products are exported. Its area is 3,793 sq. m. Pop. 43,000. Rivera, the capital, is situated in the N. of the dept. Pop. 8,000.

River Clyde. British steam collier of 3,913 tons gross, converted into a troopship, from which a memorable landing was made on "V" beach at Gallipoli, April 25, 1915. After the landing the vessel was refloated by an Admiralty salvage party, and then taken into Mudros Harbour, June 8, 1919, later to Malta, and in Jan., 1920,

was sold by auction in London to Spanish shipowners for £11,500. See Dardanelles; Gallipoli, Landing at.

River Engineering. Branch of civil engineering dealing with the canalisation, diversion, and maintenance of rivers and with works for their improvement generally.

Canalisation includes all work involved in rendering a river or stream navigable, which in its natural or existing state is either wholly or partially unnavigable for any or all of the following principal reasons: variation of flow due to tidal range and rapid fall; alternate drought and floods; insufficient volume of water; the presence of shoals, rocks, etc., or the formation of a bar, sandbanks, or a delta at its outlet; tortuous course; variations in depth and width due to scour, silting, and the absence of proper banks and the existence of low level bridges. In order to determine whether a river can be made navigable, it is necessary to ascertain the sources and volume of water, the variation in flow, whether it can be increased or rendered more uniform, the gradient or fall, especially of the section to be canalised, the causes and extent of obstructions and the practicability of their removal, and of subsequently maintaining a navigable channel, and the rights and interests of riparian owners and others.

Deltas are formed by the deposit of sediment carried down by the stream and silting up at the outlet; bars and sandbanks are due to similar causes. The remedies are dredging and the construction of training jetties and sluicing basins at the mouth, such as are employed for scouring estuary harbours. Rock is removed by blasting with dynamite. Shoals of sand and mud and deposit in a river bed are dredged until a sufficient depth and width are attained. A tortuous

course may be greatly improved and shortened by dredging or excavating new channels across sharp lends. Low level bridges may be raised or replaced by high level bridges, or, where the approach gradients do not permit of this, may be replaced by movable bridges of the swing, lifting, or transporter type. A section of undue width may be reduced and the stream kept within desirable bounds by the construction of continuous banks or detached dykes, which may either be faced with stone set in cement mortar, or be retained by sheet piling or other available means, or may consist of solid masonry walls.

Where the volume of flow is insufficient, it may be possible in certain instances to increase it by diverting other sources of supply into the stream, but cases are rare in which a serious shortage could be made good in this way.

River engineering deals with the variation of flow due to alternating periods of drought and floods. Natural river beds are only of sufficient capacity to provide for normal discharge; consequently during floods rivers overflow their natural boundaries and inundate low-lying country. As a result of this and the deposit of sediment brought down from higher levels, some rivers change their courses for considerable distances from time to time.

To provide against these effects the following methods may be adopted: (1) Dams and reservoirs may be constructed, if possible, in the upper regions, by means of which flood water may be stored against the dry season, as in the case of the Assuan dam on the Nile. Such works are usually carried out more particularly in connexion with water supply, irrigation, and canals. (2) The construction of continuous banks or detached dykes on low-lying sections where flooding and erosion occur, may direct the stream into a definite channel. With this must be a system of cross dykes for guiding the flood water back again into the river, and so preventing scour behind the walls. Continuous banks are suitable where ordinary flood water can be entirely contained, but for large rivers the cost is often prohibitive, and detached lengths of dyke are employed, more especially on curved sections, where the centrifugal force of the current has the worst effect.

Variations of flow due to tidal range and rapid fall may be corrected by the division of a river into sections known as reaches, this being done by the construction of weirs across the waterway at inter-

vals determined by the fall. By this means a gentle fall, unaffected by tidal variations, is maintained between the weirs, over the crest of which the water discharges itself into the channel below. The two commonest forms of weir are solid dams and dams with sluice gates, which may be raised during floods to hasten the discharge of flood water. The weir on the Thames at Richmond was constructed so that at high tide the tidal water rises to water level in the upper reach. At each weir a lock is provided through which boats may pass from one reach to another. In addition to a lock a ramp is occasionally provided, up and down which small craft can be hauled by hand.

The diversion of a river consists either of deflecting its course into a channel which it previously occupied and executing the necessary works to prevent another change of course, or, more frequently, of excavating a new channel. In such cases the new channel is either excavated as far as possible in the dry, the water being admitted on its completion, or the work is performed by dredging. See Assuan; Canal; Dam; Dredging; Irrigation; Lock; Weir; consult also Rivers and Canals, L. F. Vernon Harcourt, 2nd ed. 1896; River and Canal Engineering, E. S. Bellasis, 1913.

River Hog (*Potamochoerus*). Species of ungulate mammal found in W. Africa. It has



River Hog. Species of pig found in herds in the forests of W. Africa

bright red bristles, and is often known as the red river hog. It occurs in herds in swampy parts of the forests, usually near rivers, and feeds upon plants and roots, often doing great damage in the native plantations.

Riverina. Dist. of Australia, in New South Wales. It includes all the counties situated between the Lachlan and Murray rivers W. of the meridian of Wagga-Wagga. Entirely a lowland with an average rainfall of 20 ins., and possibilities of irrigation from the Murrumbidgee and the boundary rivers, and comprising a small artesian basin which yields subterranean

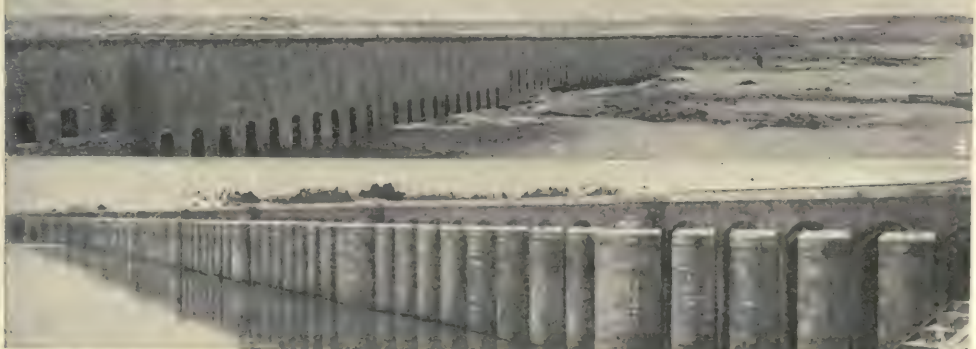
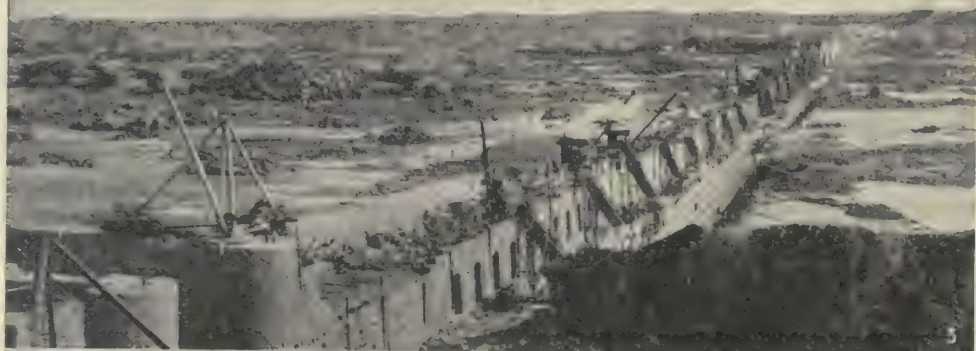
water through bores, the Riverina is an excellent wheat-growing area and very suitable for sheep rearing. The Murray red gum is localised here. Most of the dist. is nearer Melbourne than Sydney, and the rlys. run S. to Melbourne and E. to Goulburn and Sydney. Deniliquin and Hay are the largest towns of the district.

River Plate. Combined estuary of the Uruguay and Paraná rivers in S. America. It provides an entrance for merchant ships to the ports serving the vast food-producing areas of the pampas. See La Plata, Rio de.

Rivers, EARL. English title held in turn by the families of Woodville and Savage. In 1466 it was given to Sir Richard Woodville, but it became extinct when the 3rd earl died in 1491. In 1626 it was revived for Thomas Darcy, from whom it passed to a grandson, John Savage, who became the 2nd earl in 1640. It remained in the Savage family until the death of the 5th earl, who was a priest, in 1735. It is supposed that the name was first taken from that of a Devonshire family.

Richard Savage (c. 1660-1712), who became the 4th earl on the death of his father, Thomas, the 3rd earl, in 1694, was notorious for his gallantries and debaucheries. He showed himself a soldier of ability in the wars against France, after which he became a general, master-general of the ordnance, and commander-in-chief. He was also an M.P., and as a politician was concerned with the accessions of William of Orange and George I. He is the earl who lived with the countess of Macclesfield, and was claimed as a father by Richard Savage (q.v.). Died Aug. 18, 1712.

Rivers, RICHARD WOODVILLE, 1ST EARL (d. 1469). English statesman. Of a Northamptonshire family, he served in the French wars, and made his fortune by marrying Jacquetta of Luxembourg, widow of the duke of Bedford, regent of France, 1436. Temporarily disgraced for his presumption, he regained the king's favour, and in 1448 was made a baron. A staunch Lancastrian under Henry VI, he changed sides under Edward IV, and in 1466 became treasurer and was created Earl Rivers, his daughter Elizabeth having married the king two years previously. On the defeat of Edward at Edgecote Rivers fell into his enemies' hands and was executed, August 12, 1469. See Lancaster and York, 1399-1485, Sir J. H. Ramsay, 1892; The Paston Letters, ed. J. Gairdner, new ed. 1914.



1. The western channel of the Assuan Dam at the commencement of the work, 1898. 2. Masonry and sluices in the western channel, during construction. 3. The dam in the course of building, from the left bank of the Nile. 4. The dam as it was completed in 1902, from up-stream. 5. The Assiut barrage, from the right bank

RIVER ENGINEERING: STAGES IN CONSTRUCTION OF THE NILE DAMS

Rivers, ANTHONY WOODVILLE, 2ND EARL (c. 1442-83). English statesman. Son of the 1st earl, he fought at Towton in 1461, and in 1469 he became lieutenant of Calais and succeeded to his father's title. He acquired great influence in the Yorkist party, for whom he defended London. His chief claim to fame lies in the fact that his *Dietes and Sayings of the Philosophers* was the first production of Caxton's press, 1477, and therefore the first book printed in England. On the death of Edward IV, Earl Rivers fell a victim to the malice of Richard III, and was beheaded at Pontefract, June 25, 1483. See Bible.



2nd Earl Rivers,
English statesman

Riverside. City of California, U.S.A., the co. seat of Riverside co. It stands on the Santa Ana river, 58 m. E.S.E. of Los Angeles, and is served by the Atchison, Topeka, and Santa Fé and other rlys. The neighbouring district produces large quantities of oranges and lemons. Portland cement is manufactured. Riverside was settled in 1870 and incorporated in 1883. The chief of its famous drives is Magnolia Avenue, 10 m. long. Pop. 19,300.



Riverside, California. Magnolia Avenue, one of the famous drives in the capital of the fruit-growing district

Rives, WILLIAM CABELL (1793-1868). American politician. Born in Virginia, he became a leader of the Democrats in that state. He was a member of the House of Representatives, 1823-29, and of the Senate, 1832-34, and again, 1835-45. Rives was U.S. minister in Paris, 1829-32, and again, 1849-53.

Riveting. Method of joining the edges of metal plates. The edges to be riveted are either

overlapped to make a lap joint (Fig. 1), or are brought squarely together and both riveted to a strap on one side—single butt joint (Fig. 2), or to strips on both sides—double butt joint (Fig. 3). A lap joint is sometimes strengthened with a strap (Fig. 4).

Rivets have snap (spherical), pan, conical, or countersunk heads (Fig. 7), and the joints are "closed" to one or other of these forms. Since the sectional area of a rivet increases as the square of the diameter, while the area of the metal against which it presses increases only directly as the diameter, the size which can be advantageously employed for any one thickness of plate must necessarily be limited. The formula $D = 1.2 \sqrt{t}$ is generally used, where D = diameter of rivet and t = thickness of the plate.

For single-riveted joints the pitch, or distance between centres of rivets, is based upon the quality of the rivets and the plates riveted. The minimum is two diameters, the maximum about three diameters. The strength of a single-riveted joint is about 60 p.c. that of the undrilled plates.

Double-riveted joints have two rows of rivets, either in line with one another—chain riveting (Fig. 5), or staggered, as shown in Fig. 6. The rivets of a row can be placed twice as far apart as for single riveting. Double riveting gives a strength of about 75 p.c., treble riveting of about 85 p.c. In butt joints the riveting on each side the seam is the same as in a lap joint.

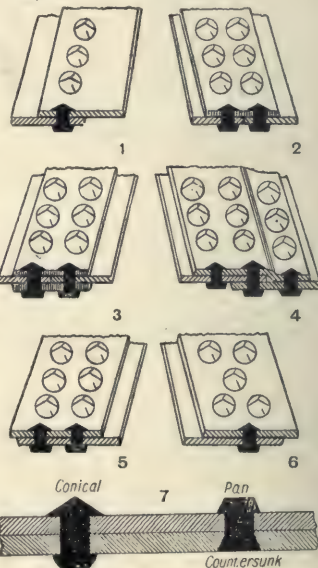
The best method of making rivet holes is by drilling. If plates are punched, the holes should be made under size and afterwards be reamed to full size. No hole should be less than one diameter from an edge.

Steel and iron rivets (unless small or very long) are heated to redness before being closed, either with a hand-hammer, a pneumatic hammer, or a hydraulic or electric press (see Hydraulic Machinery). In hand-riveting the head of the rivet is "held up" with a hammer much heavier than the striking hammer, and the point is finished off with a snap or mould. Hydraulic riveting, now used where-

ever possible for large work, is much the quickest and gives the best results. To close a large rivet and press the plates together, a squeeze of 150-200 tons is exerted. Riveted joints are subsequently made tight along the edges with a hammer and caulking tool.

Riviera. Narrow coast strip on the Ligurian Sea (*q.v.*), extending from Fréjus to Leghorn. Backed by the S. slopes of the Maritime and Ligurian Alps and the Ligurian Apennines, it stretches for 140 m. E. and W. of Genoa as the Riviera di Levante and Riviera di Ponente respectively. With all the charm of a mt. background, a delightfully sunny winter climate, rich typically Mediterranean vegetation, and a wonderful glow of colours, it is a noted tourist resort.

In the W. the French littoral surrounds the principality of Monaco; here are Nice, Antibes, Hyères, Villefranche, and Monte Carlo. In the larger Italian section to the E. are Savona, Genoa, and Spezia. The indigenous flora has been so enriched with imported plants that there are specimens of all the most notable plants of the world, including thirty species of palms, eucalypts, and camphor trees. The season extends from November to May. Communications include the Corniche Road, the P.-L.-M. and Italian State rlys., local and other steamers, and tramways. Cannes, Mentone, Grasse, San Remo, Rapallo, Bordighera are other notable resorts.



Riveting. Examples in common use.
See text



Riviera. Map of the French and the western portion of the Italian Riviera. Inset, plans of Nice and Monaco

As a health resort the Riviera is specially suited to sufferers from chronic rheumatism, nervous disorders, various chronic forms of catarrh, asthma, and the early attacks of phthisis, as well as to convalescents from other diseases who require reinvigorating; all such visitors can readily find suitable resorts off the main roads and away from the noise and bustle of the most fashionable spas.

Minor resorts, beginning in the E. and going W., are Pietra Santa, pop. 9,000, with the cathedral of San Martino, the church of Sant' Agostino and the Battistero; Seravezza, pop. 10,000, with marble quarries inaugurated by Michael Angelo in 1517 and a palace of Cosimo I, erected in 1559; Santa Margherita, pop. 7,000, with an ancient church and the Castello Cervara; Camogli, pop. 7,000, with a school of navigation and the memory of its former greatness as a port for sailing vessels; Recco, pop. 4,000, birthplace of Nicoloso da Recco, who discovered the Canary Islands, with the parish church of San Giovanni; Bogliasco, pop. 2,000, with a very picturesque ancient Roman bridge; Nervi, pop. 3,600, and Pegli, pop. 6,000, with a moist and dust-free atmosphere and a mild climate very suitable to winter visitors; Varazze, pop. 10,000, with shipbuilding yards and the 12th century church of Sant' Ambrogio. See Corniche, La; Genoa; Mentone; Nice; consult also A Book of the

Riviera, S. Baring-Gould, 1905; The Riviera, William Scott, 1907; The Riviera of the Corniche Road, Sir F. Treves, 1921.

Riviere, BRITON (1840-1920). British painter. Born in London, of Huguenot descent, on Aug. 14,



Briton Riviere,
British painter
Russell

1840, he was educated at Cheltenham and Oxford. Riviere exhibited three pictures at the Royal Academy as early as 1857, and established his growing reputation firmly by his Academy picture, Charity, in 1870. He became an animal painter of remarkable skill, and among his notable successes were Circe, 1871, widely circulated as an engraving; Daniel, 1872; Sympathy, 1878; Actaeon, 1884; Adonis Wounded, 1887. Examples of his work are to be seen in the Tate Gallery, many provincial galleries, and at that of the Guildhall, London. A.R.A. in 1878, he became R.A. in 1881, and died April 20, 1920. See Androcles.

Riviere du Loup. River of Quebec, Canada. It rises in the highlands of the province, in the Grand Lac des Îles, flows through the Lac au Sorcier, and continuing S. falls into the St. Lawrence about midway between Montreal and Quebec in the lake of St. Peter, one

of the expansions of the great river. The town of Fraserville stands on the right bank of the Rivière du Loup en Bas, N.E. of Quebec. Louiseville is on the left bank of the Rivière du Loup en Haut.

Rivington, CHARLES (1688-1742). English publisher. Born at Chesterfield, Derbyshire, he was apprenticed to a London bookseller, and in 1711 took over the business of R. Chiswell under the sign of the Bible and Crown. Thereafter, the religious philosophical publications issued by him established the reputation of the firm. In 1741-42 he published Richardson's Pamela. Dying Feb. 22, 1742, he was succeeded by his son, John (1720-92), who, becoming publisher of the S.P.C.K. in 1760, extended and widened the scope of business by editions of English classics. On his death the business was carried on by his sons Francis (1745-1822) and Charles (1754-1831), who started The British Critic in 1793, and further extended the firm. The business passed to the children of these brothers, and was taken over by Longman from Francis Hansard, grandson of Charles the elder, in 1890. See The Publishing Family of Rivington, S. Rivington, 1919.



Charles Rivington,
English publisher

Rivoli. Town of Italy, in the prov. of Turin. It is on a ridge, 8 m. W. of Turin, with which it is connected by rly. It is a resort for the wealthy merchants of Turin. The inhabitants are mainly engaged in the manufacture of silk and macaroni. Pop. 8,000.

Rivoli. Village of Italy, in the prov. of Verona. It stands on the river Adige and is on the main route from Tirol, 13 m. N.W. of Verona. Here, Jan. 14-15, 1797, the French gained a notable victory over the Austrians. After their defeat at Arcola (*q.v.*), the Austrians gathered their forces for an attack on the French, who had established themselves on the heights of Rivoli. On the morning of Jan. 14, Napoleon began the battle by a charge against the Austrian centre. Ably supported by Joubert and Masséna, he inflicted a crushing defeat, driving the panic-stricken enemy before him and taking over 12,000 prisoners. Masséna earned the title of duke of Rivoli for his services in the battle.

Rixdorf. Urban district in the dist. of Potsdam, lying S.S.E. of Berlin, of which it forms an outer suburb. In 1912 its name was officially changed to Neukölln. In 1737 Moravian emigrants from Bohemia settled here alongside a much older German town of the same name, and the two places form an industrial unit with textile and other manufactures. It is on the Ringbahn (circular rly.) and is also linked with Berlin proper by electric tramways. Pop. 237,000.

Riyadh. Capital of the emirate of Nejd and Hasa, Arabia. It occupies a depression in the plain, and is almost enclosed with date gardens, which are irrigated by buckets from deep wells. The town is surrounded by high mud-brick walls protected by a ditch, there being six fortified gates. The principal mosque is adjacent to the huge palace of the emir. The people, who number 10,000, are Wahabite Mahomedans.

Rizal, José (1861-96). Filipino patriot. Born at Calamba in the Philippines of Malay stock, he was educated at the Jesuit college in Manila. He went to Europe to study medicine and became a skilled optical surgeon. But his studies, begun in Madrid, were extended in Paris, Heidelberg, and Berlin to cover philology and the social institutions of Europe. In Europe he published, in 1886, in Spanish a novel, translated into English as *Friars and Filipinos*, 1900, which was a powerful indictment of Spanish rule in the Philippines and of the greed and bigotry of the



Rivoli. Napoleon and Masséna at the battle of Rivoli, Jan. 14, 1797. From the painting by H. E. F. Philippoteaux

Versailles

religious orders there. He was forced to leave his native island a few months after his return, and published in 1891 *El Filibusterismo*, a sequel to his earlier novel. After receiving assurances of personal safety, he returned to Manila in 1891, but was banished to Mindanao on a charge of organizing a secret society. In 1896 he volunteered for a yellow fever campaign in Cuba, but was seized on the way, brought back, and shot as a traitor, Dec. 30, 1896.

Rizzio or **RICCIO**, **DAVID** (c.1533-66). Italian musician, favourite of Mary Queen of Scots. A native



David Rizzio, Italian musician

of Pancalieri, near Turin, he came to Scotland as an attendant of an Italian envoy. He attracted the attention of Mary, who gave him an appointment in her court, first as a singer in the chapel, then as a valet de chambre, and finally as secretary.

This promotion of a foreigner and a Roman Catholic in the royal favour, which took place about the time of the marriage with Darnley, roused the suspicions of the Reformers, and rumours of intrigues with Rome began to grow current. In spite of this, however, his influence at court gradually increased, and by about 1564 he was one of the most powerful persons in the kingdom, rich and haughty. This made the nobles jealous, while Darnley believed that the queen and her servant were lovers. The outcome was a plan to kill Rizzio,

and the deed was carried out, March 9, 1566, at Holyrood, after he had been dragged from Mary's presence. The conspirators showed their vindictiveness by inflicting 56 wounds upon the body. See *Mary Queen of Scots*.

Rjukanfos (Nor., reeking or foaming fall). Grand cascade of Norway, in Telemarken. It is formed by the river Maane, which makes an almost perpendicular descent of 415 ft.

R.M. Abbrev. for Resident Magistrate; Royal Marines.

R.M.A. Abbrev. for Royal Marine Artillery.

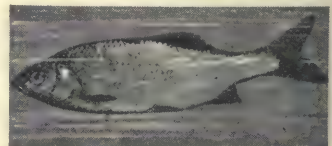
R.M.L.I. Abbrev. for Royal Marine Light Infantry.

R.N. Abbrev. for Royal Navy.

R.N.R. - Abbrev. for Royal Naval Reserve.

R.N.V.R. Abbrev. for Royal Naval Volunteer Reserve.

Roach (*Leuciscus rutilus*). Common fresh-water fish. It is found in nearly all the British rivers, and



Roach. Fish common in British and N. European rivers
W. S. Bertridge, F.Z.S.

in most European rivers N. of the Alps. It is of silvery colour, with red fins in the adult. It attaches its eggs to aquatic plants, and they hatch out in a week or fortnight, according to the temperature. It is a popular fish with the angler, as its wary habits call for considerable skill to take adult specimens, but its qualities as a table fish are poor.

ROADS AND ROAD-MAKING

C. G. Harper, Author, *The Great North Road*, and A. Williams

Articles on allied subjects include Inn; Motor Car; Transport. See also those on Icknield Way; Watling Street, and other Roman roads; Britain, with map; Highway; Surveying, etc.

Early literature, including the Bible, contains many references to roads, which are a necessity to even a rude civilization. The ordered might of the Roman Empire was maintained only by the provision of a well-considered scheme of roads on the European continent, and in Britain. There were four great Roman routes in Britain, Watling Street, Fosse Way, Ermine Street, and Icknield Way.

It is certain that these roads were founded on already existing rude tracks the Romans found when they conquered Britain, and that the quality of the work done in reconstructing them was singularly varied. Roman roads were in general surveyed and executed with such science and solid workmanship that they have ever been considered models to the more modern road-maker.

The classic Roman method was, having laid out the line of road, to trench either side, removing the earth down to firm ground. The trenching would go in advance, while the excavation of the road itself followed, down to the subsoil. A layer of fine earth, spread over this and rammed hard, formed the *pavimentum*. Squared stones, generally bound together with liquid mortar, represented the next stage (*statumen*), followed by a thicker mass of small rubble, mixed with lime (*rudus*). A further stratum, known as *nucleus*, was added, this being chalk, broken tiles, and gravel, mixed with lime and compacted by ramming. The actual road-surface, the *summa dorsum*, was then laid. Its composition varied, but the ideal was cut stone, accurately fitted, somewhat like the setts of modern practice. The finest surviving specimen in England is the road over Blackstone Edge in Yorkshire.

French and English Systems

While Roman roads are in general straight, they are so only within limits. They consist of a series of *alinements*. But this depended greatly upon the personal practice of the various surveyors and the peculiarities of the country.

Road-making decayed with the fall of the Roman Empire. Already when the Saxons came to Britain, the roads had largely fallen into disuse, and it was not until the reign of George III that any serious attempt was made to deal with communications. This was the great era of local Turnpike

Acts, of which hundreds were passed, providing for the maintenance and remodelling of roads, the cost to be met by tolls. The era of the great road engineers then followed. In France, Trésaguet adopted the Roman system of excavating and putting in a solid foundation of large stones to support the successive upper layers of smaller material; but no cement was used, and the surface construction and upkeep left much to be desired.

In England John Loudon Macadam attacked the problem of providing a more durable surface, and early in the 19th century introduced his system of covering roads with layers of hard stone broken into cubical pieces, which under pressure would jamb and become consolidated. For the stability of the surface he trusted mainly to good drainage of the subsoil. His successor, James Telford, who remodelled the great London-Holyhead road, followed Trésaguet in insisting on the importance of a strong foundation, but his surfacing method differed considerably from that of Macadam.

Highway Construction

Leaving town roads out of consideration for the present, a substantially made modern highway is constructed in a trench excavated to a depth of about 18 inches and bottom-rolled until it is compacted everywhere, and has a gentle slope from the centre to both sides. If the Telford foundation be used, the earth is covered with large stones closely packed and wedged so firmly that they cannot move. Then follows a layer of well-rolled broken stone, thicker at the centre than at the edges. The surfacing is usually two layers of two-inch "macadam" rolled down to a thickness of three inches. A dressing of chips or gravel is given to fill up interstices and help to keep the whole mass together.

If the more strictly macadamised form be preferred, the foundation consists of a layer or layers of stones larger than those for the top, and all the material is consolidated by the roller as put in. Macadam entirely deprecated the use of water in road-making, but the modern methods of steam-rolling exhibit a complete reversal of practice, and water is now freely used, wrongly, as many contend. It is, therefore, all the more

necessary that, in this procedure, a road should have a pronounced camber, and that the side drainage should be thorough. But acutely cambered roads are most undesirable for motor-traffic, especially when pneumatic tires are used, as they conduce to skidding.

C. G. Harper

The economy of using hard stone has now been thoroughly recognized, the first heavy cost being eventually more than recouped in the longer life of the surface and the lessened need for clearing and repair. Basalts, syenites, and granite form the best road-metal, and come largely from the Cleo Hills in Shropshire. But even the best macadamised surface is not equal to the disintegrating effect of fast motor-traffic, which creates much dust and in a very short time establishes "pot-holes." These, retaining water, soon ruin the best-made roadway.

Methods of Surface Protection

The problem therefore arises, how to protect the surface and through it the structure. This has been met in several ways. Spraying the surface with hot tar and then sprinkling with fine granite chippings is an alleviative, but it is a thin coating, soon worn through. A more expensive surface, but with a longer life, is formed by using broken granite, steel-furnace slag, and granite chippings, coated with tar-products. This readily amalgamates under steam-rolling, and is waterproof. Various methods of laying are employed.

(1) The matrix, or binder, is spread to a depth of three-quarters of an inch, and the prepared stone distributed over it in two layers. Rolling follows till the matrix works up through the interstices of the stone. More binder is then applied to the top and rolled in. Finally, the surface is sealed by a coating of hot tar, sprinkled with fine chippings.

(2) The stones are spread first and the matrix is added as rolling proceeds, till a solid surface is obtained. Sealing follows.

(3) The stones are spread and rolled well, and the matrix is forced in afterwards. The sealing is then done as mentioned above.

(4) The stones are rolled and grouted by pouring in hot composition mixed with sand or other fine material.

In all cases the object aimed at is to obtain a surface at once resilient and watertight. The first cost per square yard is considerably higher than for water-bound macadam; but the upkeep cost

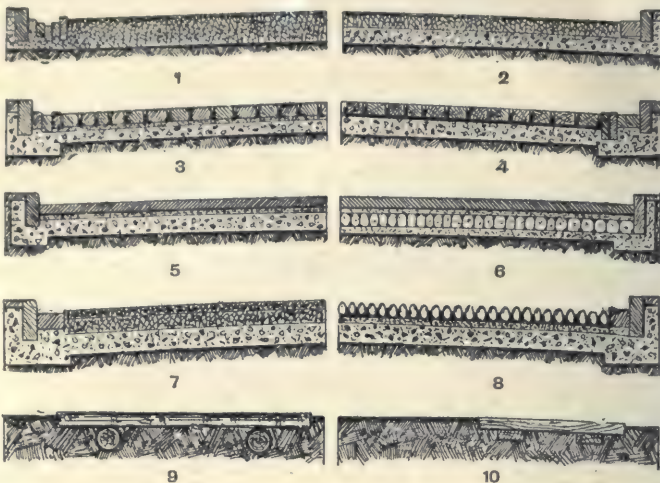
over a number of years is decidedly lower, while the dust nuisance is greatly mitigated.

The methods described do not, however, spell finality. The main road of the future probably will be the concrete road, an entirely modern method of road-construction, designed for heavy traffic, which during the last few years has made great progress in the estimation of surveyors, who were at first not disposed to look upon it with approval. The concrete road is not, as might be supposed, constructed simply by excavating and filling in with solid concrete, but by placing on a foundation of that material a continuous web of steel mesh, upon which any description of surface favoured by individual surveyors, or necessitated by local conditions, is placed.

The especial merits of this type of road-construction are its resiliency and long life. The U.S.A. possess some 50,000 m. of concrete roads, and in England there are perhaps 4,000 m. An expenditure of £30,000,000 is foreshadowed on roads in Great Britain, including restoring existing routes, making new ones, and the provision of concrete roads at an estimated cost of £5,000 per mile. The road mileage in England and Wales is 150,692, of which 27,802 are main. The upkeep in 1912 cost £13,398,533. Roads in Scotland total 24,771 miles; and in Ireland 55,562.

CITY ROADS. The main traffic arteries of cities are paved with asphalt, wood blocks, or granite blocks, on a foundation of concrete. These pavements are expensive to lay, but have a long life. The asphalt generally used is a natural rock composed of limestone and bitumen, the latter constituting one-twentieth to one-quarter of the bulk. The rock is ground to powder, heated, spread on the concrete foundation, and compacted with hot iron rammers to a thickness of two inches. Wood blocks are eight or nine inches long, three inches wide, and five inches deep. The grain runs vertically in a laid block. Soft woods—now preferred as wearing more evenly than hard—are creosoted before use. When the blocks have been set, the joints are partly filled with liquid pitch and then grouted to the surface with cement-and-sand mortar.

Sett paving is a reversion to the Roman method of surfacing, and an improvement on the old-fashioned cobble-stone pave. The best setts are those which do not chip or laminate under heavy blows, or become very slippery with wear. Specifications for setts



Road. Sectional diagrams showing methods of construction of standard types. 1. Old Macadam, graded stone on natural foundation. 2. Modern Macadam. 3. Granite setts. 4. Wood blocks. 5. Asphalt, with cushion layer. 6. Asphalt on stone blocks. 7. Tar Macadam. 8. Continental style cobbles. 9. American corduroy road, made with logs. 10. American plank and earth road. 2, 3, 4, 5, 7, and 8 are laid on concrete foundations

impose small limits of variation in depth and width, but allow considerable differences in length. A granite cube must not vary from standard more than a quarter of an inch or so in dimension. A bedding layer of sand is interposed between the blocks and the concrete foundation. The joints are filled with chippings and pitch. Sett paving is noisy, but very durable under the heaviest traffic, and is therefore much used in the neighbourhood of docks. Good setts can be taken up and relaid several times.

A. Williams
Bibliography. Treatise on Highway Construction, A. T. Byrne, 4th ed. 1901; The Great North Road, C. G. Harper, 1901, and other works by the same author; Roman Roads in Britain, T. Codrington, 1903; Construction of Roads, F. Latham, 1903; Our Roman Highways, U. A. Forbes and A. C. Burnester, 1904; British Progress in Municipal Engineering, W. H. Maxwell, 1904; The King's Highway, R. Ryves, 1908; The Stane Street, H. Belloc, 1913; Bibliography of Road Making and Roads in the U.K., D. Ballen, 1914; Construction of Roads, A. Law and D. K. Clark, new ed. 1914.

Road Board. Department of the British Government established in 1909. It consisted of five members, the chairman being paid a salary, and its work was to construct new roads and to improve existing ones, either directly or by means of grants to local authorities. An income was provided by earmarking for this purpose the proceeds of the duties on motor spirit and part of those from carriage, including motor-car, licences. From its inception to March 31, 1918, the

board had received £7,566,099 and had spent £4,592,656; in addition, various schemes had been accepted, including a new western approach to London from Chiswick to Hounslow. The outbreak of the Great War checked these activities and deprived it of the bulk of its income. However, it continued in being, working for the army council, the admiralty, and the ministry of munitions, in providing and maintaining roads, and made suggestions for improvements to be carried out on the arrival of peace. In 1919 the board was absorbed into the new ministry of transport.

Roanne. Town of France, in the dept. of Loire. It stands on the left bank of the Loire, which is navigable at this point, 40 m. N.W. of Lyons. The church of S. Étienne, dating from the 13th–16th centuries, was rebuilt in the 19th century. The hôtel de ville contains a museum of Roman antiquities. There are spinning, weaving, colour, and machinery factories, and anthracite mines. Roanne was known to the Romans as Rodumna, and was the capital of Roannais. It became important in the 15th century and was a duchy in 1566. In 1846 it was inundated by the Loire, much damage being done. Pop. 36,400.

Roanoke. River of the U.S.A. Formed by the confluence of the Staunton and Dan rivers, which have their source in the Blue Ridge, it flows generally S.E. through Virginia and N. Carolina to Albemarle Sound. It is, including the Staunton, 450 m. in length,

and navigable by steamers for 120 m. to Weldon.

Roanoke. City of Virginia, U.S.A., in Roanoke co. It stands on Roanoke river, 55 m. W. of Lynchburg, on the Virginia and the Norfolk and Western Rlys. Here is Virginia College, and in the neighbourhood are Roanoke, Elizabeth, and other colleges. A commercial and industrial city, Roanoke has rly. workshops, flour mills, bridge works, and agricultural implement, twine, motor-vehicle, and hydraulic factories. Roanoke became a city in 1884. Pop 50,800.

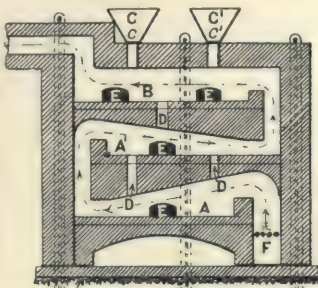
Roaring. Complaint affecting horses. Roaring or whistling in a horse may result from catarrhal affections of the throat, but the fault more usually arises from defects in the air passages, and is in such case hereditary. It is particularly a failure of the thoroughbred horse, more especially those of Barb stock, but is rarely found in cobs or ponies. There is no cure, but a tracheotomy tube inserted in the throat prevents the sound. Judicious dieting does much to palliate the trouble. *See* Horse.

Roaring Forties. Part of the S. oceans between 40° and 50° S. lat. Here the sailor encounters the prevalent and frequently boisterous W. winds of the S. hemisphere, the Brave West Winds. Sailing ships rounding the Horn into the Atlantic rely upon these winds; going in the opposite direction such ships are compelled to tack far to the S. to avoid them, and so enter within the limits of pack ice. These winds, blowing for thousands of miles over the oceans, bring regular rains to the W. coasts of Tasmania and S. Island, N.Z.; during the S. winter they carry rain to the S. of Australia.

Roasting. Metallurgical process wherein ore is heated high enough to cause chemical change, but not sufficiently high to melt ore. Chloridising roasting consists of heating with salt, and the product is a chloride. Sometimes the roasting is conducted at a low temperature and with a limited supply of air to produce sulphates. Such a process is called sulphating. During roasting some minerals become magnetic, and can then be separated by means of a magnet. Oxidising roasting is heating in a current of air, and the products are mainly oxides. With reducing roasting a metal is separated from a chemical compound by a reducing agent such as coal or carbon. *See* Furnace; Mineralogy.

Roasting Furnace. In metallurgy, a type of furnace in which ores are heated to expel certain

constituents, or change their form without actually melting the ore. The roasting furnace is frequently a reverberatory furnace, and in that



Roasting Furnace. Diagram illustrating construction of a double furnace. *See* text

case the ore is not in contact with the fuel, but the heat is reverberated from the top or sides of the furnace to the ore. The figure shows a double roasting furnace with pre-heating hearth. A, A', roasting beds; B, hearth; C, C', hoppers with sliding doors, C, C', for the introduction of ore. D, D, D are openings through which ore is passed from one bed to the bed below; E, E, E, E, side doors for raking and removal of roasted ore; F, furnace. A roasting hearth is also a form of roasting furnace, the simplest and oldest type. *See* under the names of particular furnaces, e.g. Brown's, Siemens', etc.; also Calcination; Furnace.

Roatan OR RUATAN. Island off the coast of and belonging to Honduras, Central America. It is 40 m. N.W. of Trujillo and is 30 m. long and 8 m. wide. Covered partly with forest and partly with grassy plains, it yields tropical fruits. Roatan on the S. coast is the administrative centre for the Bay islands, of which Roatan Island is the largest.

Roath. Suburb of Cardiff, S. Wales. It stands on the Rhymney, to the S.E. of the city proper. Here is S. Margaret's Church, rebuilt in the 19th century, to which is attached the mortuary chapel of the marquess of Bute. Roath Park is a large public park. *See* Cardiff.

Robben. Island of S. Africa. Situated at the entrance to Table Bay, S. Africa, about 8 m. N.W. from Cape Town, it is a leper and convict settlement, with a pop. of 1,500. Its Dutch name means Seal Island.

Robbery. In law, theft from the person, accompanied by violence. The English law is set out in the Larceny Act, 1916, s. 23, re-enacting an earlier statute. Every person who (a) being armed with any offensive weapon or

instrument, or in concert with one or more other persons, robs, or assaults with intent to rob, any person; or (b) robs any person and at the time, or immediately before or after, uses personal violence, is guilty of felony. He may be punished by penal servitude for life or any less period, and in addition may be sentenced to be whipped, if a male. The essence of robbery is violence or terrorism. *See* Larceny; Theft.

Robe. Word originally used for a garment, but now applied more especially to one worn on ceremonial occasions. Such are the robes worn at coronations, by peers at the opening of Parliament, by mayors and aldermen, and by persons in authority at the universities. There are also distinctive robes for the great orders of knighthood. *See* Costume; Gown; Knighthood.

Robert. Masculine Christian name of Teutonic origin. It means bright fame. It was early popular in France, whence it passed to England and Scotland, becoming very frequent in both countries. The Italian form is Roberto. Robin is a diminutive. Hob and Rob are contractions used in Scotland; Bob is more frequent in England. Rupert is a variant of Robert. It is frequent in Germany under the form Ruprecht and became known in England owing to the fame of the cavalier prince Rupert. The feminine form is Roberta.

Robert I. King of Scotland. Official designation of the ruler who is better known as Robert Bruce. *See* Bruce.

Robert II (1316-90). King of Scotland. Born March 2, 1316, he was a grandson of Robert the



Robert II, King of Scotland

Bruce, his mother being the king's daughter; his father was Walter the steward of Scotland and, having taken this for a surname, Robert was the first of the line of Steward or Stuart kings who later became also kings of England. When only two years old, Parliament chose him as Bruce's successor, but the birth of a son to Bruce in 1324 changed the position. This son, David II, became king in 1329, and from then until 1371 Robert was one of the chief men of his kingdom. Several times he was made regent, and he was a leader at the battle of Neville's Cross, but later he rebelled against David and was

imprisoned. The dissension was healed, and when David died childless in 1371, Robert, then an old man, succeeded. He reigned for 19 years, most of which were troubled by wars in which he could take little part. He died May 13, 1390, and was succeeded by his son, Robert III.

Robert III (c. 1340-1406). King of Scotland. The eldest son of Robert II and his mistress, Elizabeth Mure, he was declared legitimate and made earl of Carrick. He was prominent in public affairs during the reign of his father, and in 1390 he succeeded to the throne, taking the name of Robert instead of his baptismal John. As a ruler he was incompetent, and the kingdom was governed by his brother, the earl of Fife, by his son, David, and then by another brother, the duke of Albany. Robert died, a broken man, April 4, 1406. His eldest son, David, duke of Rothesay, having died before him, his successor was the younger son, James I.



Robert III,
King of Scotland

Robert I (d. 1035). Duke of Normandy, known also as Robert the Devil. Son of Richard II of Normandy, he succeeded his elder brother Richard III in 1028. He consolidated his authority against various rivals, secured from Henry I of France the Vexin territory, and supported the sons of Ethelred against Canute. After the pestilence of 1033 in Normandy, Robert set out for the Holy Land, and died of fever at Nicaea on his way home. His only and illegitimate son was William the Conqueror. His sobriquet came from his ruthlessness in war.

Robert II (c. 1054-1134). Duke of Normandy. The eldest son of William the Conqueror, he quarrelled with his father, and in 1079 there was war between them. In 1087, however, he became duke of Normandy and was soon at strife with his brothers, William and



Robert II,
Duke of Normandy

Henry. In 1096 he pledged the duchy to William II and went on a crusade, from which, after many daring deeds, he returned to find Henry king of England. Henry bought off Robert's claims, but the

two soon came to blows. In 1106 a battle was fought at Tenchebrai, and Robert was made prisoner, and he remained in captivity until his death at Cardiff in Feb., 1134. His son, William the Clito, was at one time a claimant for the English throne.

Robert Elsmere. Novel by Mrs. Humphry Ward. On its publication in 1888 it created something of a sensation; partly owing to its theme, that of the conflict between old-fashioned faith and the new Christianity. Not altogether successful as a story, the critical ability of which it gave evidence

EARL ROBERTS OF KANDAHAR

Spenser Wilkinson, Professor of Military History, Oxford

See the articles on the wars in which Roberts took part, e.g. *Afghan War*; *Indian Mutiny*; *S. African War*; also *Paardeberg*. See also the biographies of soldiers who were associated with Roberts, e.g. *Kitchener*; *Nicholson*, and others

Frederick Sleigh Roberts was born Sept. 30, 1832, at Cawnpore, the son of General Sir Abraham Roberts of the East India Company's service. He was educated at Eton, Sandhurst, and Addiscombe, and became second lieutenant in the Bengal Artillery, Dec. 12, 1851. In 1852 he sailed to Calcutta, whence it was in those days a three months' journey to Peshawar. There for a year he acted as aide-de-camp to his father, who was in command of the district. In 1854 he was appointed to the horse artillery, and in 1856 to the quartermaster-general's branch of the staff.

This appointment brought him into touch with the men who were shortly to make their mark in Indian history, John Lawrence, Herbert Edwardes, and John Nicholson, whom of all men he most admired. In May, 1857, occurred the outbreak at Meerut, the beginning of the Indian Mutiny. The chief officers at Peshawar met to determine the action to be taken in the Punjab, and Roberts had the duty of writing the minutes of their conference. He was appointed staff officer to Neville Chamberlain's mobile column, afterwards taken over by Nicholson. In response to an appeal from Delhi for artillery officers, he travelled alone to that place, where he was appointed D.A.Q.M.G. for the artillery. At the end of the siege he was appointed D.A.Q.M.G. to the column sent to Cawnpore, which on the way fought the actions at Bulandshahr and at Agra.

From Cawnpore, Roberts marched with Hope Grant to the Alum-Bagh, where he was introduced to Sir Colin Campbell, commander of the second expedition for the relief of Lucknow. Campbell entrusted

him with a series of dangerous missions, and when the column fought its way into Lucknow it was Roberts who three times hoisted the British flag on the summit of the mess-house. After the relief of Lucknow, Hope Grant, marching up the Doab to Fatehgarh, defeated a band of mutineers at Khudaganj, Dec., 1857, and in the pursuit after this action Roberts saved the life of a sowar and rescued a standard from two sepoys, thus winning the V.C. Roberts acted as A.Q.M.G. to Sir Hope Grant's column until the end of March, 1858, when he turned over the duties to Garnet Wolseley, and came home on sick leave. He remained nearly a year at his father's house at Waterford. In May, 1859, he married Nora, daughter of Captain John Bews, and in July he sailed with his wife to India.

Again in the Q.M.G.'s branch, he was engaged in the Umbeila expedition of 1863, in the Abyssinian expedition in 1867, and the Lushai expedition in 1871. In 1875 he became Q.M.G. of the Indian Army, and in March, 1878, commander of the Punjab Frontier Force. Shortly afterwards the ameer of Afghanistan rejected Lord Lytton's overtures, and war was declared against him. Roberts was given command of the Kurram Field Force, with instructions to occupy Kurram and Khost. He attacked and defeated the Afghans at the Peiwar Kotal.

In the following year the murder of Cavagnari, the British agent at Kabul, led to a renewal of the war, and Roberts was ordered to march to Kabul. With 7,500 men he invaded Afghanistan by the Shutargardan Pass, defeated the Afghan army at Charasia, Oct. 6, and next

day entered Kabul. In May, Sir Donald Stewart, with a strong column from Kandahar, arrived at Kabul and took over the command; but in July the British force at Kandahar suffered a disastrous defeat by the army of Ayub Khan. Roberts at once offered to lead a column from Kabul to Kandahar. With 10,000 troops he set out on August 9, and reached Kandahar on Sept. 1. Next day he attacked and defeated Ayub Khan's army.

After a year in England, Roberts was appointed commander-in-chief at Madras, where during four years of command he improved the recruiting and training of the army. In 1885 he became commander-in-chief in India, and during the next eight years reorganized the defence of the North-West Frontier, strengthened the army by recruiting it from the more warlike races, and raised its gunnery and musketry instruction to a high pitch of excellence. He returned home in 1893, and in 1895 was appointed



Sir Frederick Roberts in 1880. From the portrait by W. W. Oules, R.A.

commander-in-chief in Ireland. In 1897 he published *Forty-One Years in India*, a record of his experience and of his opinions on Indian military and political questions.

In December, 1899, Roberts was offered and accepted the command-in-chief of the army in South Africa. The whole course of the war was altered by Roberts at a blow. He defeated Cronje at Paardeberg, and marched across

the Free State to Bloemfontein, and afterwards to Johannesburg and Pretoria. By the middle of September the Boer army as an organized force had disappeared. Roberts then returned home, leaving Lord Kitchener in charge.

In January, 1901, Roberts, now created earl and field-marshal, became commander-in-chief of the British army. He insisted on good shooting by both artillery and infantry, and much improved the training of the militia, the volunteers, and the yeomanry. But in

February, 1904, the government of A. J. Balfour abolished the office of commander-in-chief, and Lord Roberts was retired. Shortly afterwards he became president of the National Service League. To this cause Roberts devoted himself during the next ten years, warning his countrymen of the struggle in which they were likely to become involved. When it began in 1914, he was anxious by his presence to encourage the troops of the Indian contingent in France. On Nov. 11 he crossed to Boulogne, and spent the next two days visiting the headquarters of the Indian regiments. During this short tour he caught a chill, which on Nov. 14 proved fatal. On Nov. 19 he was buried in St. Paul's Cathedral. He left only two daughters, the elder, Aileen, becoming Countess Roberts by a special remainder. His only son, Frederick Hugh S. Roberts, a lieutenant in the artillery was mortally wounded at the battle of Colenso, Dec. 15, 1899, during an attempt to save some guns. Posthumously he was awarded the V.C.

Roberts had a short, well-knit figure, and a piercing eye; he was a perfect rider, and had few superiors in handling the lance. His courage and coolness in danger were coupled with an intuitive power of divining the effect of his own moves on the enemy.

Bibliography. *Forty-one years in India*, 1897; *Speeches and Letters on Imperial Defence*, 1906; Kurum, Kabul, Kandahar: Three Campaigns Under Roberts, C. G. Robertson, 1881; Lives, C. R. Low, 1883; W. Jerrold, 1900; H. G. Groser, 2nd ed. 1900; W. E. Cairns, 1902; Sir G. Forrest, 1914; In Good Company, C. Kernahan, 1917.

Roberts, ARTHUR (b. 1852). British comedian. Born Sept. 21, 1852, he made his first appearance

as a mimic and vocal comedian in 1878. He was successful in the variety halls, until he transferred to the theatrical stage in 1883, establishing a reputation in musical comedy and comic opera. He returned to the music hall stage in 1904. He wrote *The Adventures of Arthur Roberts*, 1895.

Roberts, CHARLES GEORGE DOUGLAS (b. 1860). Canadian author. Born near Fredericton, New Brunswick, Jan. 10, 1860, he was educated at the university of New Brunswick, where he



Arthur Roberts, British comedian
Claude Harris

After G. F. Watts, R.A., painted in 1898.
National Portrait Gallery, London

Roberts

graduated with high distinction in 1879. He became a schoolmaster, 1879; edited *The Week*, 1883-84; and was professor at King's College, Nova Scotia, from 1885-95. He served in the British army in the Great War, becoming major in 1917. Meanwhile he had



Charles Roberts,
Canadian author

become known as a prolific writer of verse, essays, and fiction, and especially of tales of animal life in the Canadian wilds. Among his numerous books may be mentioned *Orion* (poems), 1880; *History of Canada*, 1897; *Collected Poems*, 1900; *Kindred of the Wild*, 1902; *Red Fox*, 1905; *Haunters of the Silences*, 1907; *Babes of the Wild*, 1913; *In the Morning of Time*, 1919; *New Poems*, 1919; *Some Animal Stories*, 1920.

Roberts, DAVID (1796-1864). Scottish painter. Born at Stockbridge, Edinburgh, Oct. 24, 1796, he worked under a house-painter, and began his career by scene painting. Later he painted picturesque buildings and landscapes in England, Normandy, Italy, Spain, and the Holy Land, and published volumes of drawings of Eastern subjects, becoming a very popular artist. He was elected A.R.A. in 1839, R.A. in 1841, and died in London, Nov. 25, 1864.



David Roberts,
Scottish painter

Roberts, EVAN (b. 1879). Welsh revivalist. Born in 1879, he worked for some years as a collier, and then studied for the ministry. He conducted revival services in many parts of Wales, in 1905-6. These created extraordinary enthusiasm, giving rise to one of the most notable Welsh



Evan Roberts,
Welsh revivalist

revivals. After a brief and meteoric career his health broke down, and he discontinued preaching.

Roberts, GEORGE HENRY (b. 1869). British politician. Born at Chedgrave, Norfolk, he entered the printing trade, and became

organizer of the Typographical Association and president of the Trade Council, Norwich. Becoming a member of the I.L.P. in 1886, he was returned as Labour M.P. for Norwich in 1906. Appointed a lord commissioner of the treasury, he was parliamentary secretary to the board of trade, minister of labour, 1917-18, and food controller, Jan., 1919, to Feb., 1920.

Roberts, JOHN (d. 1880). British billiards player. He was born at Liverpool, and in 1844 became marker at Oldham. In 1849 he challenged Jonathan Kentfield, on whose refusal he assumed the title of champion. He introduced spot-stroke play; and in March, 1862, made the record break, up to then, of 346, which included 55 spot hazards. He held the championship until defeated by his pupil, W. Cook, at St. James's Hall, London, Feb. 11, 1870. Roberts continued playing in matches and tournaments for some years; afterwards he retired to Manchester, and died in London.

His son, John Roberts, jun. (1847-1919), was born at Manchester, Aug. 15, 1847. For many years he was the most accomplished and attractive billiards player in the world, his open and all-round methods being delightful to watch. When playing against E. Diggle, on May 3-4, 1894, he compiled a magnificent spot-barred break of 1,392. Roberts won the professional billiards championship in 1870, against Cook, holding the title against him in 1875, 1877, and 1885, and beat C. Dawson, 18,000 up level, by 1,814, for £200 and the championship in 1899. He travelled widely, visiting India, Australia, Canada, the U.S.A., on several occasions as an exponent of billiards. He died at Worthing, Dec. 23, 1919. See *Modern Billiards*, with an autobiography of Roberts, 1902.

Roberts, MORLEY (b. 1857). British novelist. Born in London, Dec. 29, 1857, he was educated at Bedford and Owens College, Manchester. He led a varied and adventurous life in Australia, the

U.S.A., Canada, S. Africa, etc., and his experiences on land and sea coloured many of his writings.



Morley Roberts
Hoppe

One of the foremost English writers of the short story, and a capable novelist, his books include *The Western Avernus*, 1887; *Red Earth*, 1894; *The Great Jester*, 1896; *A Son of Empire*, 1899; *The Promotion of the Admiral*, 1903; *The Private Life of Henry Maitland*, supposed to be based on the life of George Gissing, 1912; *Time and Thomas Waring*, 1914; *Hearts of Women*, 1919; *Lyra Mutabilis*, 1921.

Roberts Memorial Workshops, LORD. British social welfare scheme. Following the S. African War, there was inaugurated in 1904 a scheme for training disabled soldiers and sailors in various handicrafts. Centres were established in different parts of the country, and named after Lord Roberts, who took a personal interest in their work. Up to the outbreak of the Great War, the workshops were a success, over £50,000 having been paid to disabled men in wages, and in Aug., 1914, Lord Roberts advocated a large extension of the scheme. After his death this was carried out as a memorial to him, and 14 branches were inaugurated all over the country, at Birmingham, Plymouth, Bradford, etc. That at Fulham, London, employed over 1,000 men, who were engaged in making toys and other articles. In 1921 a crisis arose owing to lack of funds, and some of the shops were closed.

Robertson, JAMES PATRICK BANNERMAN ROBERTSON, BARON (1845-1909). Scottish lawyer. Born at Forteviot, the son of a minister, he was educated at the high school and university, Edinburgh. In 1867 he became an advocate, and soon came to the front, his gifts including a logical mind, a wide knowledge of law, and a mordant wit. A conservative in politics, he was M.P. for Bute-shire, 1885-91; solicitor-general for Scotland, 1885-86 and 1886-88; and lord



Baron Robertson,
Scottish lawyer

Elliott & Fry

advocate, 1888-91. From 1891-99 he was president of the court of session, and in 1899 he was made a law lord and a life peer, as Baron Robertson of Forteviot. He died Feb. 2, 1909.

Robertson, Frederick William (1816-53). British divine. Born in London, Feb. 3, 1816, his father was



an artillery officer. After a somewhat desultory education at Edinburgh and elsewhere, including a year in France, he was articled in 1834 to a solicitor at Bury St. Edmunds. Disliking this, he studied for the army, and then, having given up the idea of a commission, entered Brasenose College, Oxford. In 1840 he was ordained in the Church of England, and became a curate at Winchester and then at Cheltenham. In 1847 he was appointed incumbent of a proprietary chapel at Brighton, and there he remained until his death, Aug. 15, 1853, the result of disease of the brain.

In a few years Robertson, although not popular in the usual sense of that word, made himself one of the most influential preachers of the 19th century, and his sermons are among the few that rank as literature. His views are generally described as broad church, but his sympathies were too wide for any such classification. See *Preaching*; consult also *Sermons*, 1855; *Addresses*, 1858; *Life and Letters*, Stopford A. Brooke, 1865.

Robertson, Sir George Scott (1852-1916). British soldier. Born Oct. 22, 1852, he entered the Indian Medical Service in 1878, served in the Afghan War, 1879-80, and in 1888 became agency surgeon of Gilgit, Kashmir. After various journeys among the hill tribes he was sent on a political mission to Chitral in 1895, and was besieged there for two months, during which time he was badly wounded. In recognition of his gallantry he was knighted, retiring from public service in 1899. He died Jan. 1, 1916.

Robertson, John Mackinnon (b. 1856). British man of letters and politician. Born at Bredick,

Arran, Nov. 14, 1856, he was educated at Stirling, but left school at the age of 13. Associated with Charles Bradlaugh on *The National Reformer*, which he edited, 1891-93, he became a recognized authority on freethought. Entering Parliament as Liberal member for Tyneside, 1906, he became parliamentary secretary to the board of trade, 1911-15, and privy councillor, 1915. He was chairman of the Committee on Food Supply, in 1916. His publications include *Modern Humanists*, 1895; *Montaigne and Shakespeare*, 1897; *A Short History of Freethought*, 1899; *Trade and Tariffs*, 1908; *The Baconian Heresy*, 1913; *War and Civilization*, 1916; and *The Germans*, 1916. He contributed to this work the articles on *Criticism and Freethought*.

Robertson, Thomas William (1829-71). British dramatist. Born at Newark-upon-Trent, Jan.



T. W. Robertson,
British dramatist

9, 1829, of a stage family of Scottish descent, he began life as an actor, tried journalism, was rejected for the army, and had written several unsuccessful dramas before he achieved success with *David Garrick*, 1864. His other plays include *Society*, 1865; *Ours*, 1866; *Caste*, 1867; and *School*, 1869. *Caste*, his best piece, originally produced by the Bancrofts at The Prince of Wales's, still holds the stage. Robertson had the faculty of creating life-like characters, and his plays reflect accurately the manners of his time. He died in London, Feb. 3, 1871. See *Life and Writings*, T. E. Pemberton, 1893.

Robertson, William (1721-93). Scottish historian. Born in Midlothian, Sept. 19, 1721, and educated at Edinburgh University, he entered the ministry of the Church of Scotland, holding charges first in E. Lothian, and afterwards in Edinburgh. In 1759 appeared his *History of Scotland*, which was an immediate success, and led to his being appointed principal of Edinburgh University and Historiographer Royal for Scotland. Other books, *A History of Charles V.*



William Robertson,
Scottish historian
After Reynolds

1769, *A History of America*, 1777, brought great financial reward; for the former he received no less than £4,500.

Modern historical research has impaired the value of much of Robertson's work, notably in the case of the *History of Scotland*, yet he will always be read for his wonderful narrative powers and his eloquent treatment of great events. He is at his best in the *History of America*; his description of Columbus approaching the New World is one of the most impressive passages in all literature. It was the reading of Robertson's works that first awakened Carlyle's interest in history. He died June 11, 1793. See *Life*, D. Stewart, 1801.

Robertson, Sir William Robert (b. 1860). British soldier. Born at Welbourn, Lincolnshire,



W. Robertson
Vandyk

he enlisted as a private in the 16th Lancers in 1877, becoming corporal in 1879 and serjeant in 1882. While in the ranks he showed exceptional promise and determination to make a career in the army, and as troop-serjeant-major, to which he was promoted in 1885, decided to qualify for a commission. He passed the necessary examinations and tests, and was gazetted second lieutenant in 1888, proceeding to India that year to join the 3rd Dragoon Guards. He remained there until 1896, during which period he rose to rank of staff-captain, served as intelligence officer with the Chitral relief expedition, worked in the intelligence branch at Simla, and received the D.S.O.

In 1896 he entered the staff college at Camberley, the first ranker to do so, and on passing out in 1898 joined the intelligence

division at the war office, and proceeded to S. Africa in 1899, serving on the staff and taking part in various battles. From 1902-7 he was again at the war office (intelligence), then served as chief of the staff, Aldershot, and in 1910 was appointed commandant of the staff college, Camberley, which post he retained until 1913, when he became director of military training at the war office.

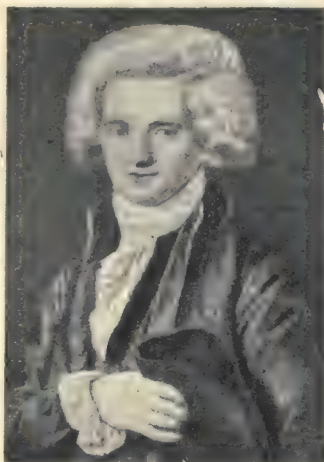
Robertson went to France in Aug., 1914, as Q.M.G. of the expeditionary force, and was chief of the staff, Jan.-Dec., 1915. In Dec., 1915, he went to the war office as chief of the imperial general staff. From that time onward, and especially after Kitcheners' death in June, 1916, Robertson was in supreme direction of the British military operations on all fronts. He resigned early in 1918, owing to a difference of opinion with the Government as to the Versailles War Council. He held the Eastern command, Feb., 1918-March, 1919, when he became commander-in-chief of the British Rhine forces, vacating that position in 1920.

For his war services Robertson, who had been knighted in 1913, was made a baronet, and received £10,000, in Aug., 1919. Promoted major-general 1910, lieutenant-general 1915, general 1916, he was created a field-marshal in 1920, thus becoming the first and only soldier in the British army to rise from private to the highest rank. He published in 1921 his autobiography, *From Private to Field-Marshal*. See Sir W. Robertson, G. A. Leask, 1917. **G. A. Leask**

Robes, MISTRESS OF THE. Official of the British royal household. Senior lady of the queen's household, the mistress of the robes attends her on all state occasions. Invariably a duchess, she does not reside at the palace, and is the only lady whose appointment is political and ceases with the ministry. See Royal Household.

Robeson Channel. Strait separating N.W. Greenland from N.E. Ellesmere Island, Arctic America. It connects Hall Basin on the S. with Lincoln Sea on the N. It is 50 m. long, and its width varies between 11 m. and 24 m. It is blocked with ice nearly all the year round, but Peary succeeded in taking a ship through the channel in both directions. See Arctic Exploration.

Robespierre, MAXIMILIEN MARIE ISIDORE (1758-94). French revolutionist. Born at Arras, May 6, 1758, he became an attorney at his native place, and was one of the representatives of the



Robespierre

After Ducreux

Third Estate, when the States-General was assembled in France on May 5, 1789. Fixed convictions, extreme zeal, and an ostentatious disinterestedness, joined with an enormous egoism and some talent, soon made him prominent among the extremists, with whom the Jacobin Club presently became identified.

It was on his proposal that the Constituent Assembly passed the self-denying ordinance which excluded its members from its successor, the Legislative Assembly, 1791. It was therefore as a member of the Jacobin Club, not of the Assembly, that Robespierre continued to lead the extreme faction in association with Marat and Danton. He was, however, again elected to the National Convention which met at the end of Sept., 1792, and proclaimed the French Republic. He had already brought about the creation of the Revolutionary Tribunal. In the Convention he was at first, with Danton, leader of the extreme section known as the Mountain, who after the execution of the king, Jan. 21, 1793, entered upon their victorious struggle with the Girondists. Elected, July, 1793, to the recently appointed Committee of Public Safety, which was to all intents and purposes a commission endowed with absolute powers for the government of France, Robespierre was the person most responsible for the Reign of Terror, and after the execution of Desmoulins, and Danton, April 5, 1794, he became in effect Dictator.

But the Terror grew intolerable; France recoiled, surfeited with the orgy of blood, a conspiracy was or-

ganized, the blow was secretly and thoroughly prepared, and on July 27 Robespierre was suddenly and vehemently denounced in the Convention. The crash was complete. Robespierre and his most intimate allies fled, but were arrested, and next day, July 28, the head of him whom Carlyle called the "Sea-green incorruptible" fell under the guillotine. See French Revolution; Jacobins; consult also *The French Revolution*, T. Carlyle, 1837; *Histoire de R. d'après des papiers de famille*, 1865-67; *Lives*, G. H. Lewes, new ed. 1899; *Hilaire Belloc*, 1901; *R. and the French Revolution*, C. F. Warwick, 1909.

Robespierre. Title of drama in five acts by Victorien Sardou (*g.v.*). Dealing with Robespierre and the events of the Terror, it was translated by Laurence Irving and produced at the Lyceum Theatre, London, on April 15, 1899, with Sir Henry Irving and Ellen Terry in the leading parts.

Robey, GEORGE (b. 1869). Stage name of George Wade, British comedian. Born Sept. 19, 1869, he made his first appearance on the music-hall stage at the Oxford in 1891, where he soon acquired a great reputation as a comedian. In 1915 he appeared in the revue *The Bing Boys are Here*, at the Alhambra, and was later connected with other revues. During the Great War he gave his active support to many charitable organizations, and was made a C.B.E. in 1919.



George Robey,
British comedian
Foulsham & Banfield

Robin (*Erithacus rubecula*). Song-bird of the thrush family. Often called the robin redbreast, it is a native of Europe, W. Asia, and across Africa to the Canaries and Azores. In Britain, owing to its associations in legend and literature and its familiarity, it is probably the most popular bird. The bright red forehead, face, and breast separated by a blue-grey line from the greenish-brown of the upper parts, make it distinct from all other British birds. Its full bright black eye and long legs are other prominent features. The sexes are alike in colour. In the open country the robin nests usually in a hole in a grassy bank or ditch-side; but near houses it shows a fondness for utilising discarded boots, cans, kettles, and flower-pots for this purpose. Grass, moss, and dead leaves are its materials,

the lining of hair or feathers. There are from five to seven eggs of a buffy-white freckled with pale



Robin or Redbreast
W. S. Berridge, F.Z.S.

red, and there may be two or three batches in the year. The food consists mainly of insects, worms, and spiders, occasional berries, and in winter household scraps. The robin is a fighter with his own kind when they trespass upon his special territory. The sweet but limited song may be heard at all seasons. Many of the birds of the year migrate in autumn. See Eggs, colour plate.

Robinet. Ancient military engine used for hurling stones and other missiles. See Ballista; Catapult; consult also History of Projectile Throwing Engines, R. Payne Galloway, 1907.

Robin Goodfellow. English name of a familiar, mischievous fairy who has now come to be better known as Puck (*q.v.*). The Mad Pranks and Merry Jest of Robin Goodfellow were set forth in a black-letter tract of 1628.

Robin Hood. Central figure in romantic stories told in old English ballads and songs of a robber outlaw, head of a band which dwelt in Sherwood Forest. He was a famous bowman, and robbed the rich that he might give to the poor, and is variously said to have been a goodly yeoman and a certain Robert who claimed to be earl of Huntingdon. Whether there is any historical basis for the legends is matter of dispute. The ballads and poems concerning Robin Hood were collected by Joseph Ritson in 1795, and have been published in many forms. The outlaw is introduced into Scott's *Ivanhoe* as Locksley, and on this account he is supposed to have been born at Loxley in Staffordshire. His story has been told most recently in poetic plays, Tennyson's *The Foresters*, 1891, and Alfred Noyes's *Sherwood*, 1911. See Quarterstaff; Sherwood.

Robin Hood's Bay. Watering-place of Yorkshire (N.R.), England. It stands at the N. end of Robin Hood's Bay, an opening of the North Sea, 6 m. from Whitby, with a station on the N.E. Rly. Known also as Bay Town, it consists of an old fishing village on the cliffs, and of modern houses built somewhat inland. The chief building is a fine 19th century

church. According to legend, Robin Hood sought refuge at Fylingdales, a village near.

Robins, ELIZABETH (b. 1855). Maiden name of Elizabeth Robins Pennell, American author. Born at Philadelphia, Feb. 21, 1855, she received part of her education at the Convent of the Sacred Heart, Paris. In 1884 she married Joseph Pennell (*q.v.*), who illustrated many of her books, which include *Life of Mary Wollstonecraft*, 1884; *Life of Charles Godfrey Leland*, 1906; *French Cathedrals, Monasteries, and Abbeys*, 1909; *London Out of Our Windows*, 1912; *Nights, 1915; The Lovers*, 1917. She collaborated with her husband in the authorised *Life of J. McNeill Whistler*, 1910.

Robins, ELIZABETH (b. 1865). British-American actress and novelist, known in private life as Mrs.



Elizabeth Robins
Elliott & Fry

George Richmond Parks. Born at Louisville, Kentucky, she first came into prominence as an actress in Ibsen's plays, but later devoted herself with much success to the writing of novels, frequently under the pseudonym of C. E. Raimond. These include *The Open Question*, 1898; *The Magnetic North*, 1904, a fine description of the Klondyke rush; *Where Are You Going To?*, 1913, in which she deals with the White Slave Traffic; and *The Mills of the Gods*, 1920. She was also the author of a play, *Votes for Women*, 1907, and actively supported the Women's Movement.

Robins, GERTRUDE (d. 1917). British actress and dramatist. Her stage experience was gained chiefly

in the provinces, and she was for a time associated with the Gaiety Theatre, Manchester. Her short plays include *Make-shifts*, 1908; *The Point of View*, 1910; *Pot Luck*, a short farce, 1910; *Realities*, 1911; *Loving As We Do*, and *The Plaything*, 1914. She died Dec. 25, 1917.

Robinson, SIR HARRY PERRY (b. 1859). British war correspondent. He was born in the W. Indies, and educated in England, at Westminster and Oxford. He engaged



Sir H. P. Robinson,
British war correspondent
Elliott & Fry

at first in literary work, but in 1883 went to America, where he became an authority on railway matters, on which he wrote much. In 1900 he returned to England, and was for four years managing-director of the publishing firm of Isbister. He later joined the staff of *The Times*, which he represented in the W. Indies, 1909-10, becoming its American correspondent in the latter year. He served as war correspondent in Belgium, 1914, Serbia, 1915, and on the Western front from 1916-18. His books include *Men Born Equal*, 1895; *The Autobiography of a Black Bear*, 1905; *Of Distinguished Animals*, 1911; *The Turning Point: the Battle of the Somme*, 1917. He was created K.B.E. in 1920.

Robinson, HENRY CRABB (1775-1867). British journalist and diarist. Born at Bury St. Edmunds, March 13, 1775, and educated at private schools, he was articled to an attorney. He gave up the law on coming into some money, and travelled abroad, meeting Goethe and Schiller at Weimar, and studying for a time at the university of Jena. He became correspondent of *The Times* at Altona, then foreign editor, and subsequently represented his paper during the Peninsular War. In 1813 he was called to the bar, and practised for 13 years. He was a conversationalist of the first order, and his breakfasts became famous. Robinson's great tribute to posterity is to be found in his *Diary and Correspondence*, of which selections were edited and published by Sadler, 1869. Robinson died in London, Feb. 5, 1867. See Dandies and Men of Letters, L. H. Vincent, 1913.



H. Crabb Robinson,
British journalist

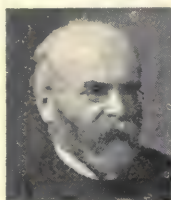
Robinson, JOHN (c. 1576-1625). English Puritan. Born probably in Nottinghamshire, he was educated at Cambridge, most likely at Corpus Christi College. Having been ordained, he worked in Norwich, but his Puritan opinions brought him into disfavour. He joined the separatists and preached to them at Gainsborough and then at Scrooby, and in 1608, to escape



Gertrude Robins,
British actress
Name

persecution, he went to Amsterdam. In 1609 he became pastor of a church at Leiden, where he formed the idea of a Puritan colony in America. In 1620, largely owing to his efforts, the Pilgrim Fathers set sail, but Robinson himself never crossed to them. He died at Leiden, March 1, 1625. Robinson is regarded as one of the founders of Congregationalism. His name is perpetuated by the Congregational church at Gainsborough, and his numerous theological works were reprinted in 1851. See Congregationalism; Pilgrim Fathers; consult also John Robinson, O. S. Davis, 1903; New Facts concerning J. Robinson, C. Burridge, 1910.

Robinson, Sir John Richard (1828-1903). British journalist. Born Nov. 2, 1828, at Witham,



Sir John Robinson,
British journalist

Elliot & Fry

Essex, son of a Congregational minister, he was apprenticed to a firm of booksellers at Shepton Mallet, and after being on the staff of The Bedford Mercury and The Wilts Independent, settled in London in 1848 as sub-editor of The Inquirer. In 1855 he edited an evening paper, The Express, and in 1868 began his long connexion with The Daily News as general manager, a post which, with the exception of the period 1887-96, when he acted as editor, he retained until his retirement in Feb., 1901. Knighted in 1893, he died in London, Nov. 30, 1903. See Recollections of Sir John R. Robinson, F. Moy Thomas, 1904.

Robinson, Sir Joseph Benjamin (b. 1840). South African capitalist. Born Aug. 3, 1840, he was occupied in farming and trading in wool until he bought a tract of some 20,000 acres of land on the Vaal river, 1867. The discovery of diamonds on his property made Robinson a wealthy man, and he played an important part in politics and was mayor of Kimberley, 1880. He owned goldfields, and became chairman of the Robinson South African Banking Company. He was made a baronet in 1903.



Sir Joseph Robinson,
S. African capitalist

Robinson, Mary (1758-1800). English actress and royal favourite. Born at Bristol, Nov. 27, 1758,

she came to London, and having received tuition from Garrick, made her first appearance as Juliet at Drury Lane, Dec. 10, 1776. On Dec. 3, 1778, she appeared as Perdita to Smith's Leontes in Garrick's adaptation of The Winter's Tale, and captured the affections of the prince of Wales, afterwards George IV, who quickly tired of her. She was subsequently the mistress of Charles James Fox, and of Colonel Tarleton, and died in poverty, Dec. 26, 1800.



Mary Robinson,
British actress

Robinson, Sir Thomas (1698-1770). British politician. The son of Sir W. Robinson (1655-1736), a Yorkshire baronet, he was educated at Trinity College, Cambridge. He was ambassador at Vienna, 1730-48. In 1754, being then an M.P., he was made secretary of state and



Thomas Robinson,
2nd Baron Grantham
After Romney

leader of the House of Commons under the duke of Newcastle, but he resigned in 1755. In 1761 he was made Baron Grantham, and he died Sept. 30, 1770. His son Thomas, the 2nd baron (1738-86), was ambassador at Madrid, 1771-79, and secretary for foreign affairs, 1782-83. His son Thomas Philip, 3rd baron (1781-1859), became Earl de Grey and took the name of de Grey on the death of his aunt, who had been made Countess de Grey in 1816. He was first lord of the admiralty, 1834-35, and lord-lieutenant of Ireland, 1841-44. On his death his titles, including the barony of Grantham, passed to his nephew, who became the marquess of Ripon (q.v.).

Robinson, William Heath (b. 1872). British artist. Born May 31, 1872, the son of Thomas Robinson, an artist, he studied art in London at the R.A. school, and soon made his mark as an illustrator of books. He was better known, however, by his humorous drawings in The Sketch and other British and American periodicals.

Robinson, William Leefe (1895-1918). British airman. Born in India, July 14, 1895, he was commissioned from Sandhurst in 1914 and joined the R.F.C. the following year, being trained in England. On the occasion of the Zep-

W. Leefe Robinson,
British airman

pelin raid on London, Sept. 3, 1916, Robinson attacked one ship, and after two hours aloft attacked another, bringing her down in flames at Cuffley. For this he received the Victoria Cross for bringing down the first Zepelin in England. In May, 1917, he was brought down at Douai while flying, and remained a prisoner until Dec. 14, 1918. He died at Stanmore, Dec. 31, 1918.

Robinson Crusoe. Novel by Defoe. The first part was published April 25, 1719, with the full title of The Life and Strange Surprising



Robinson Crusoe sees the footprint of Man Friday on the sands of his uninhabited island

From a drawing by H. L. Bacon

Adventures of Robinson Crusoe of York, Mariner; who lived Eight-and-Twenty Years all alone in an Uninhabited Island on the coast of America, near the mouth of the great River of Orinoco: Having been cast on Shore by Shipwreck wherein all the Men perished but himself: With an account how he was at last as strangely delivered by Pirates. Written by himself. The second part was published four months later. The story achieved instant popularity, and the first part has taken its place as a classic among adventure stories. It is supposed to have been founded on the experiences of Alexander Selkirk (*q.v.*), who had lived alone on the island of Juan Fernandez for four years and returned to England in 1711. See Defoe.

Roblin, Sir Rodmond Paalen (b. 1853). Canadian politician. Born at Sophiasburgh, Ontario,

Feb. 15, 1853, he was educated at Belleville. He became a farmer at Carman, in Manitoba, and later a dealer in grain in Winnipeg. In 1888 he entered the legislative



Sir R. P. Roblin,
Canadian politician

assembly of Manitoba, and in 1900 became premier and minister of agriculture, offices he retained until 1913. In 1912 he was knighted.

Rob Roy (Gael., red Robert). Popular name for Robert MacGregor (1671-1734), Highland robber. Son of a freebooter, he was brought up at Balquhider and early made a name for himself by his daring exploits and cattle-stealing raids.



Rob Roy,
Scottish freebooter

To avoid the penal Acts revived in 1693 against the MacGregor clan, he assumed the name of Campbell. In the rising of 1715 Rob Roy played no important part, but after the battle of Sheriffmuir he made various raids on the S. and W. and became a scourge to the country until captured. He soon escaped and passed the succeeding years as a fugitive until his pardon in 1727, after which he settled in Balquhider, where he died Dec. 28, 1734. See *Historical Memoirs of Rob Roy*, K. Macleay, new ed. 1881; *Story of Rob Roy*, A. H. Millar, 1883.

Rob Roy. Sixth of the Waverley novels, published Dec., 1817. Its hero is the famous robber chief of the MacGregors, who is represented as a Jacobite, involved in the 1715 rebellion, and as rendering valuable aid to Frank Osbaldistone, who tells the story. The Highland adventures stand out prominently, while the characters of Di Vernon, Bailie Nicol



Rob Roy. Birthplace of the Highland robber at Balquhider

Sept. 8 was found at the foot of the stairs with her neck broken. The coroner's jury assigned her death to mischance, but suspicion at once fell on Dudley.

Robsart, Amy. Heroine of Scott's novel *Kenilworth*. Betrothed to Edmund Tressilian, she is secretly married to the earl of Leicester, who keeps her prisoner at Cumnor Place, whence, to escape from the unwelcome attentions of Richard Varney, she flees to Kenilworth Castle, where



Rob Roy. Diagram illustrating construction of the canoe in which John Macgregor made his famous journeys

Jarvie, and the Osbaldistone family are notable. The novel, first dramatized in 1818, has formed the basis of several plays and operas.

Rob Roy. Type of canoe first built by John Macgregor, known as Rob Roy, and used by him on his journeys. Their length varies from 12 to 15 ft. and the depth from 10 to 16 ins. Sails are also provided. Such canoes weigh about 70 lb., light enough to be carried. A paddle about 7 ft. long is used. See *Canoe*; Macgregor, John.

Robsart, Amy (c. 1532-60). The daughter of Sir John Robsart of Siderstern, Norfolk, she married Robert Dudley, afterwards earl of Leicester (*q.v.*), at Sheen, June 4, 1550. The marriage was childless, and Dudley appears to have neglected her, though they remained outwardly on good terms. In 1560 Amy went to Cumnor Place, Berkshire, near Oxford, a house belonging to her husband, and on

Varney poses before the queen as her husband. Amy's letter of explanation to Leicester is delayed, and she falls through a trap-door at Cumnor as she is hastening, misled by Varney's imitation of the earl's whistle, to meet her husband.



Amy Robsart meets her death through the treachery of Varney. From the picture by W. F. Yeames, R.A.

Robson, William Snowdon ROBSON, BARON (1852-1918). British politician. The son of Robert Robson, of Newcastle-upon-Tyne, he was born Sept. 10, 1852, and educated privately and at Caius College, Cambridge. Called to the bar in 1880, he was soon enjoying a good practice, and in 1892 he was made a Q.C. Meanwhile, in 1885-86, he sat in the House of Commons as Liberal M.P. for Bow and Bromley. In 1895 he was returned for S. Shields, and in 1905 he joined the Liberal ministry as solicitor-general. Promoted attorney-general in 1908, he was made a lord of appeal, a life peer as Baron Robson of Jesmond, and a privy councillor in 1910. He retired in 1912, and died Sept. 11, 1918.

Robson, Thomas Frederick (1822-64). Stage name of Thomas Robson Brownhill, British actor. Born at Margate, he started life as a copper-plate engraver, and after some years in obscure theatres acquired, in 1853, a sudden reputation for burlesque at the Olympic Theatre, London, in Frank Talfour's travesties of Macbeth and Shylock. In August, 1857, he undertook the management of the theatre, appearing with great success in such domestic dramas as *The Porter's Knot*, 1858, and *The Chimney Corner*, 1861. Robson excelled in the humour that verges on pathos, and in grotesque parts he has seldom been surpassed. He died Aug. 12, 1864.



T. F. Robson,
British actor

Robson Peak. Mt. in the Canadian Rockies. It is on the border between Alberta and British Columbia to the N.W. of Jasper Forest Park and the Yellowhead Pass, both of which are traversed by the C.N. Rly. Alt. 13,068 ft.

Roburite. Ammonium nitrate safety explosive. Several varieties are made in England and Germany, trinitrotoluene being employed as the sensitiser. The usual English variety contains trinitrotoluene, 16 p.c.; ammonium nitrate, 61 p.c.; and sodium chloride, 23 p.c. See Explosives; Safety Explosives.

Roby, Henry John (1830-1915). British scholar. Born at Tamworth, Aug. 12, 1830, he was educated at Bridgnorth and S. John's College, Cambridge, where he graduated as senior classic in 1853. College lecturer and tutor until 1861, he became professor of jurisprudence at University College,

London, 1866-68. Engaged in cotton-spinning, 1875-93, he became M.P. for the Eccles division of S.E. Lancashire, 1890-95. Roby was best known for his *Grammar of the Latin Language*, 1871-74. He died Jan. 2, 1915.

Roc (Arab. *rokh*). In Oriental legend, a bird of gigantic size. In one of the stories of Sindbad the Sailor, in the Arabian Nights' Entertainments, it is said to feed its young with elephants. It was by tying himself to one of the legs of a roc that Sindbad was carried safely from the island on which he had been left, to be put down near the valley of diamonds.

Roca, Julio Argentino (1843-1914). Argentine statesman. Born in Tucuman, he fought in the war



Julio Roca,
Argentine statesman

against Paraguay, 1865-70, and against the Indians nine years later. Suppressing the Buenos Aires insurrection of 1880, he was elected president of Argentina, and proved an enlightened and progressive statesman. President again, 1898-1904, he settled a dangerous frontier dispute with Chile, 1902, and on his retirement he became minister to Brazil and then to Paris. He died Oct. 18, 1914.

Rocamadour. Village of France, in the dept. of Lot. It is picturesquely situated in the ravine of Alzou, 400 ft. high, and enclosed by precipitous hills. The church of S. Amadour and the chapel of the Virgin stand on the summit of a rock, and are reached by a granite staircase, which pilgrims ascend on their knees. It is one of the most



Rocamadour, France. Old gateway and church of S. Amadour, crowning the hill

ancient pilgrim resorts of France. A sword preserved here is said to be the famous Durandal of Roland. Pop. 1,050.

Rocambole or **SAND LEEK** (*Allium scorodoprasum*). Bulbous herb of the natural order Liliaceae,



Rocambole. Bulb, leaves, and flower head; inset, single flower

native of Europe. It has long, narrow leaves with a central keel down the underside. The tall flower stem ends in a head of small red-purple flowers margined with white; it produces little purple bulbs, which are used for the same purpose as those of garlic.

Roch (c. 1295-1327). French saint. He was born at Montpelier, of a noble family, and made a pilgrimage to Rome, after which he devoted himself to the care of the sick in Italy during a great pestilence. He caught the infection, but recovered and returned to France. Accused as a spy, he died in prison, Aug. 16, 1327. S. Roch, the patron of the plague-stricken, is widely venerated in S. Europe, and is commemorated by the magnificent Scuola di S. Rocco at Venice, designed 1517.

Rocha. Department of S.E. Uruguay. Facing the Atlantic Ocean, its area is 4,280 sq. m. Lead, copper, and iron are found, but the principal industry is stock-raising. Pop. 48,800. The capital, Rocha, is near Cape Polonio, and about 120 m. E.N.E. of Montevideo. Pop. 5,000.

Rochambeau, Jean Baptiste Donatien de Vimeur, Comte de (1725-1807). French soldier. Born at Vendôme,

July 1, 1725, he served in the War of the Austrian Succession, in the Minorca Expedition, 1756, and in the Seven Years' War, and by 1780 had risen to the rank of lieutenant-general. In the same year he was sent in command



Comte de
Rochambeau,
French soldier

of a French force of 6,000 men to assist the American colonists in the War of Independence, loyally cooperated with Washington, and played a prominent part in the operations which ended in the capitulation of Yorktown, 1781. After his return to France he threw in his lot with the Revolutionaries, and was made a marshal in 1791, but had a narrow escape of his life in the Terror in 1793. He died May 10, 1807. See *Memoirs of the Count de Rochambeau*, Eng. trans., M. W. E. Wright, 1838; With Americans of Past and Present Days, J. A. Jusserand, 1916.

Rochdale. County and mun. borough of Lancashire, England. It stands on the Roch, 11 m. from



Rochdale arms

Manchester and 196 m. from London, and is served by the L. & Y. Rly. and a canal. The chief buildings are the church of S. Chad, dating mainly from the 14th century, and the Gothic town hall, built 1866-71. Others are the art gallery, free library, post office, infirmary, and various churches. There is a grammar school founded in 1565, a technical school, and public parks and recreation grounds. The industries include the manufacture of cotton goods, woollen goods, machinery, and asbestos. Important cattle markets are held. For nearly 200 years the

manor was owned by the Byron family. Rochdale is noted as the cradle of the cooperative movement and the home of John Bright. It was known for its hats and cutlery in the 16th century, but was only made a borough in 1856. It became a county borough in 1888, and since 1832 has sent one member to Parliament. Pop. (1921) 90,807.

Roche, ALEXANDER (b. 1861). Scottish painter. Born at Glasgow, Aug. 17, 1861, he studied at the local school, and in Paris at Julien's and the Beaux Arts. Returning to Glasgow in 1883, he settled down as a painter of landscapes with figures, modern in subject, yet tinged with romance, and in 1896 removed to Edinburgh, and developed portrait painting, though he did not abandon his former subjects. He became A.R.S.A. in 1894, and R.S.A. in 1900. In 1900 he decorated the banqueting hall, Glasgow municipal buildings, with frescoes.



Alexander Roche, Scottish painter

Roche, SIR BOYLE (1743-1807). Irish politician. After serving in the army he entered the civil service, and sat in the Irish parliament from 1777 until the Union. He received a baronetcy in 1782 for his loyal support of the government, whom he

afterwards helped in the Catholic franchise difficulties, and he was a staunch upholder of the union. He died June 5, 1807. Roche acquired a great reputation for his witty speeches and delightful bulls.

Roche Abbey. Ruins in Yorkshire (W.R.), England. They are 1½ m. S. of Malby, and include parts of the chancel, transepts,



Roche Abbey, Yorkshire. Ruins of the chancel and transepts of the Cistercian abbey

and gateway of a Cistercian abbey founded in 1147 as an offshoot of Fountains Abbey (*q.v.*).

Rocheort-Luçay, VICTOR HENRI, MARQUIS DE (1830-1913). French journalist and politician, generally known as Henri Rocheort. Born in Paris, Jan. 30, 1830, son of Armand de Rocheort-Luçay (1790-1871), dramatist, he was educated at the Collège St. Louis. He founded the violent weekly *La Lanterne*, 1868, which was soon suppressed. Elected deputy, 1869, he founded *La Marseillaise*, was imprisoned, 1870, and acted for a short time in the provisional government, 1870. He resigned from the national assembly, 1871, and was transported for alleged complicity in the commune, but escaped in 1873. In 1880 he



Marquis de Rocheort-Luçay, French journalist



Rochdale, Lancashire. 1. Art gallery, built in 1912. 2. Parish church of S. Chad. 3. Gothic style Town Hall, built 1866-71

returned to France and founded L'Intransigeant, supported Boulanger, and worked for some years in London. Returning in 1895, he attacked the Panama scandals and the pro-Dreyfus movement. Rochefort, who was unrivalled in his powers of bitter invective, died at Aix-les-Bains, June 30, 1913.

Rochefort-sur-Loire. Village of France, in the dept. of Maine-et-Loire. It stands on the Loiret, not far from the Loire, and is noted for its white wines. There are the ruins of a château destroyed in 1214 by royal command, and later rebuilt. It was bought by Henry IV, who dismantled it.

Rochefort-sur-Mer. Seaport of France, in the dept. of Charente-Inférieure. It stands on the right bank of the Charente, 9 m. from the Atlantic and 18 m. S.E. of La Rochelle. The modern and well-built town contains the Place Colbert, with an 18th century fountain, and the church of S. Louis, built 1835, noted for its stained glass. The marine hospital is one of the best equipped in Europe. There are iron and copper foundries and machinery works, and a trade is carried on in grain, salt, brandy, wines, cattle, dairy produce, etc. The port of Rochefort was finished towards 1666, and here in 1815 Napoleon I embarked



La Rochelle, France. 1. Harbour and quays, from the tower of S. Sauveur. 2. Porte de la Grosse Horloge, the sole remaining city gate, 14-15th century. 3. Western façade of the cathedral of S. Louis

for England. Pierre Loti (*q.v.*) was a native. Pop. 35,000.

Rochelle, LA. Town and seaport of France, capital of the dept. of Charente-Inférieure. It lies in the bay enclosed by the islands of Ré and Oléron, 296 m. by rly. S.W. of Paris, and has a fine harbour. The new harbour of La Pallice, 3 m. W. of La



La Rochelle arms
Rochelle, was begun in 1890, and is now one of the best

on the W. coast of France. There is trade in cereals, coal, wines, salt, colonial produce, sardines, etc., and shipbuilding and allied industries are important. Pop. 36,371.

The towers of S. Nicolas, 1384, La Chaîne, 1375, and La Lanterne, 1445, are landmarks of the old port. The remarkable hôtel de ville, with fortified walls of the late 15th century, dates mainly from 1595-1607, with fine Renaissance façades in the courtyard. The cathedral of S. Louis, 1742-62, stands on the site of the old church of S. Bartholomew, the tower of which survives. The former episcopal palace is now a museum, and the town has many interesting Renaissance houses.

La Rochelle became prominent as a port in the late 12th century, and was made a commune in 1199. It fell to the siege of Louis VIII, 1224, passed to England by the

treaty of Brétigny, 1360, but returned to France in 1372, after a rising of townsfolk. In the 16th century it became a Huguenot stronghold, resisted the siege of the duke of Anjou, 1573, but was again besieged by Richelieu in 1627. Richelieu blockaded the town by land and sea, constructing a great dyke to block the port; about 12,000 persons are believed to have perished from privation before the town surrendered, Oct. 28, 1628. A further blow was the emigration of over 5,000 citizens after the revocation of the edict of Nantes, 1685.

Rochers de Naye. Mt. peak of Switzerland, in the Bernese Oberland. The summit, 6,710 ft., reached by rack rly. from Montreux, commands a splendid view over the lake of Geneva.

Roches Moutonnées (Fr., sheep-shaped rocks) OR SHEEP-BACKS. Name given to humps of rock subjected to the characteristic rounding and smoothing action of glaciers or ice-sheets. They are common in Switzerland and in glaciated parts of the British Isles. Pron. Rosh mootonnay.

Rochester. City of Kent, England. It stands on the Medway, 8 m. from Maidstone and 33 m. from London, being served by the S.E. & C. Rly. The chief building is the cathedral. Replacing an older building, this was erected in the 11th and 12th centuries, but later many additions and alterations were made, the result being almost a new church in a variety of styles. The chief features are the Norman west front, the crypt, the nave, and the tower and spire, a 20th century work. The treasures include cathedral records, tombs, and the choir



Rochester arms

but later many additions and alterations were made, the result being almost a new church in a variety of styles. The chief features are the Norman west front, the crypt, the nave, and the tower and spire, a 20th century work. The treasures include cathedral records, tombs, and the choir

stalls. Equal in interest to the cathedral is the Norman castle, one of the most complete ruins of its kind. The main relic is the massive keep, and the grounds are public property. Notable churches are those of S. Margaret and S. Nicholas. The guildhall is a 17th century building, and there are remains of the bishop's palace and the town walls. The ruins of Gundulph's Tower perpetuate the name of an early bishop. King's School was founded in 1544. Two old houses are Eastgate House, now a museum, and Restoration House. Near are Gad's Hill Place, the residence of Charles Dickens, and the Borstal prison.

The industries include the manufacture of cement, agricultural implements, steel, and oilcake, and there is some shipping. The town has a service of electric tramways. Both the Britons and the Romans had a settlement where Rochester stands, this being an important point on the Medway. Soon after the arrival of S. Augustine, the king of Kent founded a church and made it a bishopric. Rochester was early a corporate town, its first charter dating from 1165. Pop. (1921) 31,261.

Rochester. Third largest city and a port of entry of New York, U.S.A., the co. seat of Monroe co. It stands on both banks of the Genesee river, 7 m. from its mouth in Lake Ontario, 68 m. E.N.E. of

Buffalo, on the New York Central and Hudson River and other rlys. Across the river the New York State barge canal is carried by an aqueduct 848 ft. long, built in 1838. Among the buildings are the city hall and the masonic temple. Rochester is the seat of a university. Flour-milling and the manufacture of

machinery, camera, and photographic appliances, thermometers, boots and shoes, are industrial interests. Settled in 1810, Rochester was incorporated as a village in 1817, and became a city in 1834. Pop. 296,000.

Rochester, EARL OF. English title held by the families of Wilmot and Hyde. It was given to Henry Wilmot, one of the most devoted followers of Charles II, in 1652. He had served Charles I during the Civil War and been made a baron. It became extinct when Charles, the 3rd earl, died in 1681, two years after his father's death. In the same year the earldom was revived for Laurence Hyde, only to become extinct again when his son Henry died in 1758.



Rochester, New York. Upper Falls of the Genesee river, with a fall of 96 ft.

Rochester, JOHN WILMOT, 2ND EARL OF (1647-80). [English courtier. Born April 10, 1647, he succeeded to his father's earldom in 1658, and graduated from Wadham College, Oxford, three years later. After travelling in France and Italy, and serving in the navy, he settled at the court of Charles II, soon becoming one of the most dissolute of the king's companions. With a gift for writing delicate verse of a satirical nature, his wit made him a general favourite,



2nd Earl of Rochester, English courtier



Rochester, Kent. Cathedral from the north-west, showing the Norman west front and modern central tower

whilst his escapades were the talk of the town. He patronised and helped many men of letters. Worn out with debauchery, he died July 26, 1680. Many of his writings were too obscene for publication, but Tonson published an edition in 1741, and an expurgated edition appeared in Johnson's collection.

Rochet (French; Ital. *rocchetto*). Ecclesiastical vestment. A kind of surplice, of fine linen, it is



Rochet as worn by Anglican bishops

now worn by bishops under, instead of over, the chimere (*q.v.*). The name dates from about the 17th century, but the garment is much older. In its medieval form it had narrow sleeves, which grew to remarkable size, in English usage, in the 17th century.

Rock. Geological term for certain hard masses of the earth's crust. A rock may be an aggregate of mineral particles of one kind only; but most rocks contain several minerals, and their chemical composition varies. The rocks forming the great mass of the earth remain unknown, and are probably far poorer in silica and far richer in heavy metals, such as iron, than those of the crust. Parts of the crust, or of layers not far below it, are either molten or subject at various times to melting, and their materials sometimes reach the surface in the form of lava. By analogy with these highly heated and fluid masses, the constituents of which crystallise when cooling is sufficiently prolonged, we conclude that a number of rocks now formed of crystalline minerals were at one time molten in the crust. These rocks cut across the structures of other masses, send out veins into adjacent fissures, and sometimes include fragments of the rocks into which they have intruded.

Such rocks are grouped with superficial lavas under the name igneous, which implies, not fiery combustion, but consolidation from a molten state. Slow cooling promotes in them coarseness of grain; rapid cooling allows some of the constituents to remain uncrystallised, i.e. in a glassy state. We conclude that the basalts of Vesuvius and the diorites and granites that form mountainous scenery in the British islands are alike igneous rocks.

Another great group of rocks is styled sedimentary. Wherever rock of any kind is exposed at the earth's surface, it comes under the action of forces which cause it to break down and crumble. The mineral particles, moreover, decompose in various degrees, according to their chemical composition. Quartz is practically indestructible, and its fragments go to form sands, becoming smaller and ultimately rounded as they travel, until they come to rest in a valley-floor or sea, and are held together to form sandstone by the deposition of some mineral cement. Felspars break up chemically as well as mechanically, and their aluminium silicate takes up water and forms new substances which are the bases of clays. These clay particles become sifted out by running water from associated coarser matter, are at length deposited in quiet places, and are compacted into the sedimentary rocks, the clays and shales.

Many constituents of decaying rocks pass into solution in natural waters, and for the most part find their way into the sea. New combinations may arise from these through the activity of organisms, leading notably to the deposition of calcium carbonate as calcite or

trology, F. H. Hatch and R. H. Rastall, 1913-14; Igneous Rocks and Their Origin, R. A. Daly, 1914.

(Grenville A. J. Cole

Rockall. Islet of the Atlantic Ocean. A small rocky peak, about 100 yards in circumference, it stands about 230 m. W. of N. Uist, Hebrides. It is believed to be the only existing fragment of the lost or Palearctic continent.

Rockbreaker or **STONEBREAKER.** Machine for breaking rock or stone. There are four classes of rock or stone breaking machines: stamps, jaw breakers, disintegrators, and rolls. The most important is the Blake jaw breaker type.

It consists of two large flat jaws, A, B (Fig. 1), of hard iron or steel, each serrated on one face forming huge teeth. One is fixed vertically to a massive frame of iron, which carries all the working parts; the other is hung from a horizontal axle, so that it may swing freely. The serrated surfaces of the jaws face each other at an angle forming a large mouth, wide at the top, narrowing as it goes down. By means of a toggle C and links the hanging jaw is oscillated at its lower end towards and from the fixed jaw. D is the toggle lever,

E a wedge adjustment. The large stone is thrown into the top of the mouth and is broken between the two jaws, the pieces getting smaller as they descend to the bottom of the mouth, out of which they finally drop. Machines

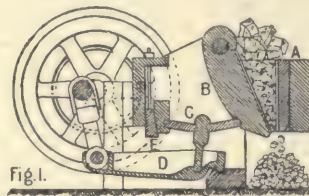


Fig. 1.

Rockbreaker.

Diagrams explaining machines. See text

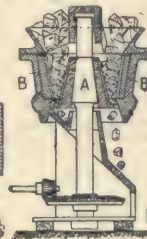


Fig. 2.

working of the

aragonite. The shells and other hard parts of such organisms go to form the important sedimentary rocks known as limestones.

Lastly, igneous or sedimentary rocks in which new structures, or new minerals, or both, have arisen through the action of pressure or heat, or commonly of both, in the earth's crust are styled metamorphic. Slate, with its planes of parting, usually quite independent of the sedimentary layer-structure; schist, with minerals developed along certain planes, which may be those of original bedding or may be superinduced by crush and flow under earth-pressure; and gneiss, which may be a coarser type of schist, or may represent an intimate mingling of igneous and sedimentary matter, are representative types of metamorphic rocks. See Geology; Petrology; consult also Text Book of Pe-

on this principle are almost universally used wherever stone is to be crushed on any important scale.

Another form of jaw breaker, shown in Fig. 2, is known as the gyratory breaker. In principle the action is the same as in the Blake machine. A is a gyrating spindle with cone jaw, B, B fixed jaws.

An important form of rock-breaker has been introduced for breaking rock under water. It consists of a massive bar with its lower end of pointed steel, which is dropped repeatedly through the water from a crane upon the point where it is desired to break up the rock. The crane and operating gear are mounted on a barge, which can be moved as required.

Rock Butter. In mineralogy, name given to a variety of halotrichite or of chrisomalite. Yellow in colour, it is found at Hurlet and Campsie in Scotland.

Rock-Climbing. Sport akin to mountaineering. The equipment is similar to that required in mountaineering, and the most important items are first-class nervous and physical condition, good climbing boots, and an Alpine Club rope of 60 to 80 ft. An ice-axe should be taken if likely to be required.

It is also very desirable that a climber should know something of the nature of the various rocks. Chalk is too friable to be taken seriously, while limestone is notoriously treacherous. Sandstone is rather more reliable; magnesian or dolomitised limestone is generally excellent to climb on, affording innumerable small holds, but not always as sound as might be. Millstone grit is very rough and as a rule thoroughly sound. It provides, however, only short continuous courses. Granite, owing to the even weathering of the exposed parts, is often difficult. It is also most uncertain in texture; one piece will be as hard and firm as iron, and the next rotten.

Porphyry and similar volcanic rocks of the English Lake District are for the most part sound, and the same is true in a lesser degree of the hills of North Wales. Aiguilles, the isolated pinnacles on Mt. Blanc and elsewhere, owe their isolation to the fact that they have withstood the weathering that has worn away the adjacent mountain mass. They are among the hardest rocks in the world. The Gabbro of Skye is the climber's delight. The one objection is that the extreme roughness may tempt liberties which would prove disastrous on other rocks.

Rock-climbing may be divided into two branches: Progress over easy rocks as a member of a party all moving together; the scaling of difficult crags with safety to the individual and the party. Three strong and competent climbers form an ideal party.

On easy rocks the climber must learn to mark and keep his distance from his companions, must take care that the rope between him and them, in front or behind, or both, is never jerked, is never slack, and does not get caught or hitched. He must be prepared to check a slip, and must be careful not to dislodge loose stones. These accomplishments are not easy of acquirement. It by no means follows that a man who is capable of scaling a difficult bit of rock is a good rock-climber.

In scaling difficult rocks only one of the party moves at a time, and it is essential that before one moves, the remainder of the party

should be securely anchored, i.e. be secure in positions in which they are able not only to take care of themselves, but of the man next them if need be. Rock-climbing consists in ascending, descending, and traversing, i.e. making lateral progress across rocks. These movements are effected for the most part with the feet and hands. Beginners have a tendency to rely too much on the hands. Frequently, however, the back, knees, or elbows are called into play. Progress is often secured by wedging an arm or leg into a fissure of the rock. The climber should be able to tie readily the following knots: the fisherman's bend, the middleman loop, the double overhand, the bowline, the bowline on a bight, and the clove hitch. See Ice Axe; Mountaineering.

C. E. Benson
Bibliography. Rock Climbing in the English Lakes, O. G. Jones, 3rd ed. 1900; Mountaineering, C. T. Dent and others, 3rd ed. 1900; British Mountain Climbs, G. D. Abraham, 1909; British Mountaineering, C. E. Benson, 1909.

Rock Cress. Large genus of annual and perennial herbs of the natural order Cruciferae, also known as *Arabis* (q.v.).

Rockefeller, JOHN DAVISON (b. 1839). American capitalist. Born July 8, 1839, he began business as a commission agent at the age of 19, and in 1862 became connected with the oil business, building the Standard Oil Refinery at Cleveland, Ohio, in 1865.



Branches were opened, and five years later a combination of firms was formed as the Standard Oil Company with a capital of £200,000, J. D. Rockefeller being president. By 1882 the combine had absorbed or outvalued nearly all similar concerns in the U.S.A., and Rockefeller had become the wealthiest man in the world. He retired from business in 1911, having already devoted large sums to charitable and educational objects. His son, John D. Rockefeller, jun. (b. 1874), was associated with his father's many enterprises.



Rockefeller Institute, New York. Building erected in 1901 for medical research

Rockefeller Institute. Short title of an institute for medical research founded by John D. Rockefeller, sen., in New York city, 1901. Its full name is Rockefeller Institute for Medical Research. The donor erected and endowed the necessary buildings at a cost of £800,000, and the original charter was amended, 1908, to extend the scope of investigation. The institute includes well-equipped laboratories, chemical, pathological, etc., and a large hospital. In 1907 a farm in New Jersey was added for breeding animals for experimental purposes, and a further biological laboratory was opened in Massachusetts, 1911. A notable rule of the institute is that all discoveries and inventions made by salaried members of the staff must be offered for the public benefit. The institute issues *The Monthly Journal of Experimental Medicine* and other publications.

Rocket (*Hesperis matronalis*). Perennial herb of the natural order Cruciferae, known also as dame's violet. The name rocket is also applied to several other plants, e.g. London rocket (*Sisymbrium iris*), dyer's rocket (*Reseda luteola*), sea rocket (*Cakile maritima*), yellow rocket (*Barbarea vulgaris*). See Cruciferae; Dame's Violet.

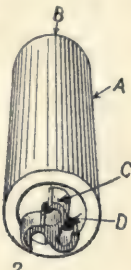
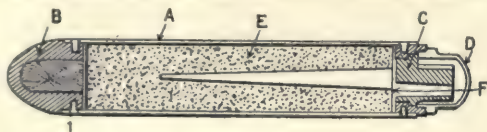
Rocket (Fr. *roquet*, or Ital. *rocchetta*, a distaff, which it resembles in shape). Firework, in which the charge is so arranged that, when ignited, the case and charge are propelled through the air. Rockets were probably among the earliest missiles containing gunpowder, and preceded artillery in the use of explosives in battles. In the early part of the 19th century they were a still recognized weapon in warfare, and rocket brigades were organized. The war rocket devised by Col. Congreve consisted of a steel tube case with a heavy cast-iron head, and a stick. In the Hale rocket the products of combustion escaped through a vent in one side of

the tail end, thus giving the rocket a rotary motion and rendering a stick unnecessary. Rockets were often effective, but owing to the improvement of artillery they have been little used since the Napoleonic wars.

An ordinary rocket consists of a stout cardboard case, closed at one end, and with a restricted orifice at the other, which is fastened to a

in addition to a rope, to throw over barbed wire entanglements with the object of pulling them out of position.

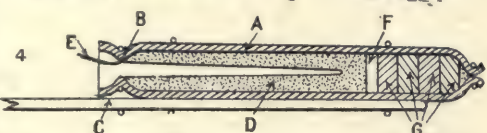
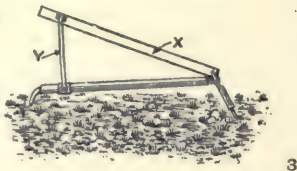
A sectional view of a war rocket is shown in Fig. 1. A is the steel outer casing, B the heavy cast-iron or explosive head, C the



stick. The case is more or less completely filled with gunpowder, tightly rammed, and formed with a conical hole for the greater part of its length, a short piece of quick-match being provided to ignite it.

The powder used is gunpowder of variable composition, and frequently the charcoal is not very finely ground, and the mixture not very well incorporated, as thereby the rocket leaves a greater shower of sparks in its trail. Generally a clay plug is placed above the powder, and in the head of the rocket is a small charge of gunpowder, and one or more coloured stars, a piece of quick-match communicating ignition from the main charge through the plug. When the rocket attains its maximum height the powder in the head explodes, blowing open the case and allowing the stars which have ignited to fall in a shower. In sound rockets the star composition is replaced by a high explosive, such as tonite, which is detonated. Rockets with a charge of magnesium powder composition in the head were at one time used for illuminating an enemy's position at night, but have now been largely superseded by star shell. Large rockets are employed for throwing life-lines over ships wrecked near the coast.

It has been proposed to use similar rockets, carrying grapnels

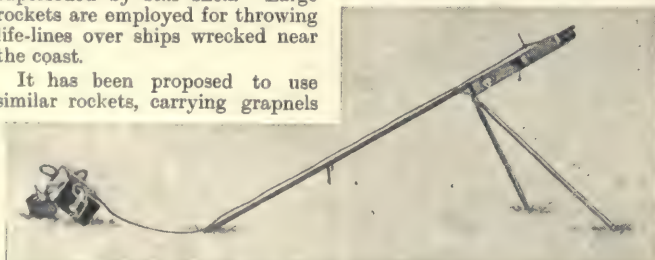


Rocket. Sectional diagrams of war rockets and appliances.
See text

tail piece, D the protecting cap for the latter. The case is filled with compressed gunpowder, E, containing a conical cavity; F is a vent for the escape of the products of combustion. Fig. 2 is a view of the tail of the rocket with the protecting cap removed, A, B, C, D having the same significance as in Fig. 1.

Fig. 3 shows a side and rear view of the launching apparatus of a war rocket; X is a channel in which the rocket is placed, Y a sliding support and clip which enables the angle of fire to be adjusted.

A common rocket is shown in Fig. 4. A is the paper case, B choked end to provide restricted outlet of products of combustion, C the rocket stick, D compressed gunpowder with conical control hole, E quick-match for lighting, F perforated plug, and G stars.



Rocket apparatus placed ready for action, showing rocket, with thin line which it carries to the ship in distress

See Ammunition; Explosives; Fire Brigade; Fireworks; Illuminating Shell; Rocket Apparatus; Star Shell.

Rocket, THE. Name of a steam locomotive built by George Stephenson (*q.v.*). This engine, in Oct., 1829, won the prize of £500 offered for the most efficient locomotive by the directors of the Liverpool and Manchester Rly., of which Stephenson was the engineer. Three other engines were entered for the competition, the only serious rival to the Rocket being Braithwaite's Novelty. The tests took place over a level 2 m. stretch of line, and the Rocket proved infinitely superior in speed and reliability, covering 12 m. in 53 minutes on the opening day of the trials. After doing good service for many years, the old engine was withdrawn, and at last found a home, together with the equally famous Puffing Billy, 1813, in South Kensington Museum, London, where it is still to be seen. See Locomotive; Railway.

Rocket Apparatus. Contrivance consisting of rocket and tube, by means of which a thin line is thrown to a vessel wrecked near the shore, the range being about 100 yds., and connexion is thus established. By means of the thin line a hawser is hauled to the ship in distress and made fast to the shore, and the rescue is carried out by means of a sling or breeches buoy, which is hauled backwards and forwards along it. The apparatus is very mobile, everything being kept in readiness at each station in a light cart or wagon. In 1855 the British government took over the system of rocket apparatus formerly maintained by the Royal National Life-Boat Institution. There are some 350 rocket apparatus stations round the coasts of the British Isles, under the direction of the board of trade, and since 1870 nearly 12,000 lives have been saved from shipwreck by means of this contrivance. See Fire Brigade; Life-boat.

Rock Ferry. Watering-place of Cheshire, a suburb of Birkenhead. It stands on the estuary of the Mersey and is served by the Birkenhead Rly. There is also regular steamer connexion with Liverpool. See Birkenhead.

Rock Fish. Popular name for certain species of wrasse (*q.v.*), a large group of fishes which occur among rocks and coral reefs. Several species are found round the British coasts.

Rockford. City of Illinois, U.S.A., the co. seat of Winnebago co. It stands on Rock river, 84 m. by rly. W.N.W. of Chicago, on the

Illinois Central and other rlys. It is the seat of Rockford College. Water power is obtained from the river for the city's industries, which include the manufacture of machinery, furniture, gas stoves, agricultural implements, and hosiery. Settled in 1834, it was chartered as a city in 1852. Pop. 65,700.

Rockhampton. Town in Queensland. It lies on the Fitzroy river, 420 m. by rail N.W. of Brisbane. The terminus of the Central Queensland Rly., and the port for the mines at Mt. Morgan, it has rly. connexions with Brisbane and the other capital cities. The dist. grazes a quarter of a million cattle, and contains large meat-works, three collieries, and gold and copper mines. Pop. 18,000.

Rockingham. Village of Northamptonshire, England. It stands near the Welland, 8 m. from Kettering, and is noted for its castle, of which some ruins remain. This is said to have been built by William the Conqueror for the protection of the ironworks in the surrounding forest. It was rebuilt in the 16th century, but was destroyed after the Civil War. Rockingham was once a market town. S. Leonard's Church has monuments of the Watson family, who owned the castle and took their titles from here. To the S. and E. of the village extended the royal deer forest of Rockingham, of which a few patches remain.

Rockingham, CHARLES WATSON-WENTWORTH, 2ND MARQUESS OF (1730-82). British statesman. Born May 13, 1730, he was educated at Westminster School and S. John's College, Cambridge. An hereditary member of the Whig party, he was made earl of Malton in 1750, and in the same year became marquess of Rockingham. He held positions at court, and in 1761 was chosen leader of one of the sections of the Whigs, becoming active at this time as an opponent of Bute. In 1765, on the fall of Grenville, Rockingham became prime minister, but he was compelled to resign in 1766. Here remained an opposition leader until March, 1782, when he was again at the head of a ministry, but three months later, July 1, 1782, he died. He left no children, and his titles became extinct. His great estates in



Rockhampton, Queensland. Suspension bridge over the Fitzroy river, looking towards North Rockhampton

Northamptonshire and Yorkshire passed to his nephew, Earl Fitzwilliam (q.v.).

Rockingham was descended from Sir Lewis Watson (1584-1653), of Rockingham Castle, who, in 1645, was made a baron, a reward for his loyalty to Charles I. His son Edward and then his grandson Thomas succeeded to his title and estates. The latter was made earl



2nd Marquess of Rockingham, British statesman
After Reynolds

of Rockingham in 1714, but the title became extinct on his death in 1746. The barony, however, passed to a kinsman, Thomas Watson-Wentworth, whose grandmother was the daughter and heiress of the great earl of Strafford. Made a marquess in 1746, Thomas, who inherited the estates of the families of Watson and Wentworth, was the father of the prime minister.

Rockingham Ware. Pottery formerly made on the estate of the marquess of Rockingham, at Swinton, near Sheffield. The works were established in 1745 and were successively controlled by Twigg, Bingley & Co., and Bramell.



Rocking Stone. The Logan Stone, Rippon Tor, a famous rocking stone on Dartmoor

Rockingham ware is of a chocolate hue, the teapots, which are characteristically long, coffee-pots, jugs, and mugs being lined with white. Quaint tea and coffee pots, shaped like fruits, with moulded leaves stuck on, were produced here, and known as "Cado-gans." Fine blue and white pottery was also produced

in these works.

Rocking Stone OR LOGAN STONE. Massive rock so poised upon its bed as to be readily swayed by hand pressure. It may be an ice-transported boulder, or a granite mass resting upon a weathered base, as at Sittaford Tor, Dartmoor. Such stones are frequent in Cornwall,



Rockingham Ware. Vase with painted landscape

Derbyshire, Yorkshire, Wales, lowland Scotland, and Ireland, often near neolithic stone monuments, and they are associated with much local folk-lore. The Logan Rock (q.v.), Land's End, weighs about 70 tons; and one at Tandil, Argentina, 700 tons. Among the Kelasa Hills, Burma, a Buddhist temple crowns a rocking stone, 3,650 ft. high.

Rock Island. City of Illinois, U.S.A., the co. seat of Rock Island co. It stands at the confluence of Rock and Mississippi rivers, opposite Davenport, and is served by the Chicago, Rock Island and Pacific and other rlys., and by the Hennepin Canal. It has the Augustana College and Theological Seminary, and on the neighbouring

island, from which the city received its name, are the U.S. arsenal and armoury, about 965 acres in extent. E. of the island the channel has been dammed to provide water power for the city's industries. These include flour-milling, iron-founding, brick-making, and the manufacture of lumber products, agricultural implements, carriages, stoves, and floorcloth. Settled in 1836, Rock Island was incorporated in 1841, and became a city in 1849. Pop. 35,200.

Rockling (*Motella*). Genus of shore fishes belonging to the cod family and nearly related to the ling. They are all of small size, and



Rockling. *Motella mustela*, the five-bearded rockling
W. S. Berridge, F.Z.S.

are represented in the British seas by several species. The young of one of these was formerly known as the mackerel midge and was long regarded as forming a separate genus.

Rock Plants. Name given to a large number of miscellaneous genera of plants which flourish in

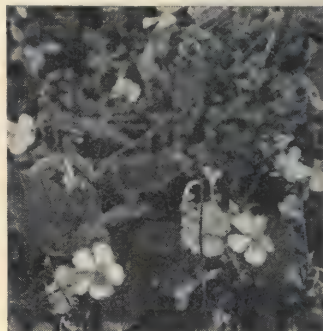
the rock garden. Their habitat being mountain slopes, they have certain common characteristics, especially long spreading roots which derive constant moisture from beneath the rocks.

Towards the close of the 19th century, a careful study of natural conditions brought the rock garden into favour, and it is now often the most brilliant, interesting, and inexpensive part of a garden. Sun and air and good drainage are essential. Trees or bushes must never overhang the plants. A full S. slope is too dry for many species. Beneath a deep bed of loam mixed with leaf-mould, silver sand, and lime-rubbish, should be an ample layer of rubble or small stones to secure drainage. The rocks, carefully grouped and in their natural positions, with only a slight backward tilt, should be deeply embedded, and the soil rammed down tightly, cavities being fatal to the plants.

For delicate Alpine plants a moraine should be made, viz. a gentle slope composed of a mixture of small chips of stone with a little soil, some 18 ins. deep. Plants of rampant or tall habit, if grown at all, must be kept away from the rest. Among the best rock plants are the smaller species of saxifraga, dianthus, campanula, primula, gentiana, phlox, helianthemum, sedum, aubrietia, aethionema, an-

drosace, daphne, lithospermum, viola, iris, scilla. See Rock Gardens, How to Make and Maintain Them, L. B. Meredith, 1910; The Rock Garden, R. J. Farrer, 1912; The English Rock Garden, R. J. Farrer, 1919.

Rock Rose (*Helianthemum chamaecistus*). Trailing shrub of the natural order Cistaceae. It is a native of Europe, W. Asia, and N.



Rock Rose. Flowers of the trailing shrub found on chalk hills

Africa. It has opposite, oblong leaves, hairy on the upper side and downy beneath. The clear yellow flowers are over an inch across. It abounds on chalk hills and dry soils. Many other species and varieties of great beauty are cultivated in rock gardens.



Rock Plants. Arrangement of a small rock garden, showing how the stones can be grouped in their natural positions, and the plants disposed in pockets and crevices



Rocky Mountains. Bow Valley and the Bow River, Alberta. A characteristic scene where the Canadian Pacific Railway traverses the Canadian Rockies. Near the head of the valley is Kicking Horse Pass

Rock Sculptures. Primitive designs incised upon rock surfaces, megalithic monuments, and other prehistoric stone objects. The simplest neolithic type comprised cup and ring markings. Other devices, presumably votive, are found at Gavv'inis, in Brittany, N. Africa, and elsewhere. In the sterile Italian Maritime Alps 7,000 designs have been found—ploughs, oxen, sickles, ploughmen—illustrating primitive Ligurian agriculture, besides conventional signs, perhaps phonetic. Similar scribbings are recorded in Finland, Portugal, and Switzerland. In Scandinavia, later in date, ploughs are intermingled with boats and sun-symbols (Tegneby). There are survivals in S. Africa, Australia, and elsewhere. See Art, Prehistoric; Assyria; Newgrange.

Rock Springs. City of Wyoming, U.S.A., in Sweetwater co. It is 258 m. W. of Laramie on Bitter Creek and the Union Pacific Rly., contains a state hospital, city hall, and public library, and is a centre for a growing trade in cereals and cattle. The neighbouring extensive deposits of lignite are being exploited. Pop. (1920) 6,500.

Rock Temple. Place hewn out of solid rock for religious uses. Four types occur. When denoting an excavation the term is interchangeable with cave temple. The excavation may be associated with an exposed rock-cut work. Thus the 12th century Gal Vihara at Polonnaruwa, Ceylon, has a recumbent Buddha, 46 ft. long, outside. The cliff side may be cut back, and the central mass sculptured into an open-air temple. The finest are the 8th century Kailas temple at Ellora, Hyderabad, a

richly sculptured pyramidal mass 100 ft. high, and a contemporary temple at Dhamnar, Rajputana. An exposed rock may be carved into a monolithic temple. See Cave Temple; Petra; Temple.

Rocky Mountain Goat (*Oreamnus* or *Haploceros montanus*). Goat-like mammal, found only in



Rocky Mountain Goat. White-coated mammal found in the mountain fastnesses of N. America

W. S. Berridge, F.Z.S.

N. America. It occupies a doubtful position between the goats and the antelopes. In size it resembles a large sheep, and is covered with long white hair. The horns are black, about eight ins. long, and rise from the forehead with a slight backward curve. It is found only in the most inaccessible parts of the mountains, and lacks the wariness of the true goats.

Rocky Mountains. Name in general use for the mountain system which stretches the whole

length of N. America from Alaska to the isthmus of Tehuantepec. Strictly, however, the name should be limited to the E. ridge of this complicated Cordillera, to the section of mountains abutting upon the plains which comprise the middle of the continent. In this restricted sense the Rockies vary in width from 20 to 60 m.; and in general they divide the Pacific drainage from that flowing over the central plains, although the Peace and Liard, in Canada, the Missouri and some of its tributaries, and the Rio Grande, in the U.S.A., rise to the W. of the ridge.

The range may be considered in four sections: N. of the Peace river, between the Peace and the Missouri, between the Missouri and the Rio Grande, and S. of the Rio Grande. In the N. section the Endicott Range, in Alaska, lies between the Yukon river and the Arctic Ocean; farther S. the Mackenzie Mts., the Selwyn Mts., and the Logan Range flank the lowlands of the river Mackenzie; in the Logan Range, Mt. Hunt rises to 9,000 ft.; the peaks in this section are in general below 8,000 ft.

Between the Peace and the Missouri lie the S. Canadian Rockies in a steep ridge N.W.-S.E. parallel to the upper valleys of the Fraser and Columbia rivers; there are considerable areas over 10,000 ft., and many notable peaks. Here are the rly.-traversed Crow's Nest and Kicking Horse passes, 4,449 ft. and 5,329 ft. respectively. S. of the Canadian border this section is continued at a lower elevation as the Kootenay Mts.

The main area of the U.S. Rockies is the broadest part of the system. In N.W. Wyoming is the

volcanic yellowstone region, with Mt. Washburne, 11,350 ft., and the Teton Range with Grand Teton, 13,690 ft.; farther E. lie the Big Horn Mts., and farther S. the Wind River Mts., with Fremont Peak, 13,790 ft. In the S. of Wyoming the ridge becomes a lofty plateau, the Laramie Plains, which form a connexion with the ranges of Colorado, where Blanca, 14,464 ft., Pike's Peak, 14,141 ft., and Long's Peak, 14,271 ft., reach the highest points of the true Rockies. From Colorado S. the elevation decreases to the Rio Grande, though Truchas Peak, N.E. of Santa Fé, reaches 13,156 ft. In the S. section, within Mexico, the Rockies continue as the Sierra Madre Oriental.

S. of the Canadian border many peaks bear a considerable snow cap, although this is insufficient to give rise to glaciers and may entirely disappear in a hot summer. In Canada, however, the Rockies are more Alpine in character; there are extensive icefields, and Victoria, Lyell, Mangin, Pétain, and many other glaciers; while Lake Louise rivals in beauty the Alpine lakes. Coniferous forests clothe the slopes, the timber line reaching 10,000 ft. in the central portions. Grizzly bears, big-horn sheep, and the Rocky Mountain goat are typical of the fauna.

In total length the Rockies stretch through 50° of latitude, with a general bearing to the N.W. from long. 100° W. to long. 150° W.; this implies a total length in excess of 4,000 m. Within the scope of the system are many elevated fertile valleys to which the name park is given, e.g. Luis Park, drained by the Rio Grande, and Yoho Park, near the Kicking Horse Pass. See Canada; Manitou; United States. **B. C. WALLIS**

Rococo (Fr. *roc*, rock). In architecture and decoration, the name given to a style that prevailed in France and elsewhere on the Continent from the middle of the 17th century to the end of the 18th. It consists of an excessive use of curves, irregular disposition



Rococo. Capital of a column in rococo style

of doors and windows, and superabundance of ornament, imitating rock work and shells, and introduced with an entire disregard of the constructional character of the design. The term has come to be applied to anything extravagant and tasteless in style.

Rocroi. Town of France, in the dept. of Ardennes. It stands near the Meuse, 15 m. N.W. of Mézières and 2 m. from the Belgian frontier. First fortified in the 16th century, the present fortifications, built by Vauban, nearly surround the town, which consists of a central square from which streets radiate to the ramparts. The church is an 18th century building. Pop. 2,200.

Rocroi is chiefly famous for the battle that was fought near it during the Thirty Years' War. It was fought on May 19, 1643, between the French under Condé, then duke of Enghien, and the Spanish under de Melo and Fuentes. The latter, about 27,000 strong, were besieging Rocroi, and battle was delivered by Condé, who commanded some 22,000 men. At first the French left wing and centre suffered repulse, but the Spaniards failed to pursue their advantage, and the French left and centre were able to re-form and attack the infantry formation of Fuentes. After four assaults they succeeded; Fuentes was slain, and the Spaniards were routed with a loss of over 7,000 killed and 7,000 prisoners. French losses were about 2,000 killed and 2,000 wounded. See Thirty Years' War.

Rod. Straight, slender shoot or branch of a tree used as an instrument for measuring, chastisement, fishing, cleaning pipes, etc., and as an emblem of office. As the last it is still used by churchwardens, by an official of the royal household, and by ushers of the chief British orders of knighthood, who are called black or green rod from the colour of the wands they carry. The term is also used in building, as of a tie rod, in engineering in a similar sense, and in machinery as in piston rod. Lightning rods are metal conductors for the protection of buildings from being struck by lightning. Aaron's rod is the name of an architectural ornament, and also of a plant, the common mullein. A divining rod is a forked twig used by water finders.

Rod, POLE OR PERCH. Measure of length and area. Lineally, it is 5½ yds., or 16½ ft.; as a sq. rod, pole, or perch, it contains 30¼ sq. yds., or 272½ sq. ft.; 160 rods equal one acre. The sq. rod is used largely in measuring brickwork.

Rod, ÉDOUARD (1857-1910). Swiss novelist. Born at Nyon, March 31, 1857, he studied at Bonn and Berlin, and lived for many years in Paris, where he edited *La Revue Contemporaine*. His early novels, e.g. *La femme de Henri Vanneau*, 1884, were influenced by Zola, but his later works were

marked by a rather morbid pessimism and critical introspection. Among his other novels may be mentioned *La Vie privée de Michel*



Édouard Rod, Swiss novelist

at Grasse, Jan. 29, 1910.

Rodbertus, JOHANN KARL (1805-75). German economist and socialist. Born at Greifswald on Aug. 12, 1805, he studied law at Göttingen and Berlin, and held posts in the judiciary at Breslau and Oppeln, 1828-32. Thereafter he devoted himself to working out his theory of evolutionary and scientific socialism, opposing the internationalist and materialist doctrines of Marx. Elected to the Prussian Assembly for Usedom-Wollin, 1848, he held for a short time the ministry of education, and was elected to the second chamber in 1849. His publications include *Soziale Briefe*, 1850-51; *Zur Beleuchtung der Sozialen Frage*, 1875. He died on his Pomeranian estate, Jagetow, Dec. 6, 1875. See *The Social Philosophy of Rodbertus*, E. C. K. Gonner, 1899.



Johann Rodbertus, Founder of scientific socialism

Rodd, SIR JAMES RENNELL (b. 1858). British diplomatist. Born Nov. 9, 1858, and educated at Haileybury and Balliol College, Oxford, he entered the diplomatic service in 1883 and, having acted as attaché in various capitals, was made second secretary to the British embassy at Rome in 1891. In 1893 he was in charge of the British agency at Zanzibar, and he remained in Africa until 1901; he was special envoy to Menelik of Abyssinia in 1897 while acting as secretary of legation at Cairo. Rodd returned to Rome as secretary of legation in 1901, and from 1904



Sir James R. Rodd, British diplomatist
Russell

was British minister at Stockholm. He was ambassador at Rome, 1908-19. He was knighted in 1899, and created G.C.B. in 1920. Rodd published several volumes of poems and one or two of prose, including *The Violet Crown*, 1891.

Roden, EARL OF. Irish title borne by the family of Jocelyn since 1771. Robert Jocelyn (d. 1756), a lawyer, who became lord chancellor of Ireland, was made Baron Newport in 1743 and Viscount Jocelyn in 1755. His son Robert, the 2nd viscount (d. 1797), was made an earl in 1771, having just inherited from a kinsman a baronetcy dating from 1665. From him, though not in the direct senior line, the present earl is descended. The earl's seat is Tullymore Park, co. Down. His eldest son is called Viscount Jocelyn.

Rodenbach, GEORGES (1855-98). Belgian poet and novelist. Born of a Flemish family at Tournai, July 16, 1855, he was educated in Paris and at Ghent University, and became a member of the Belgian bar in 1885. His main interests, however, were literary, and his first verses, *Le Foyer et les Champs*, appeared in 1877. Other volumes included *Les Tristesses*, 1879; *Le Règne du Silence*, 1891; and *Les Vies Encloses*, 1896. His poetry reflects admirably the quiet melancholy of the towns and country of Flanders, which he knew intimately, and his novel, *Bruges-la-Morte*, 1892, is a striking study of that city's life. He settled in Paris, 1887, dying there Dec. 25, 1898. He should not be confused with the Flemish poet, Albrecht Rodenbach (1856-80).



Georges Rodenbach, Belgian poet

Rodent (Lat. *rodere*, to gnaw). Animal belonging to the order Rodentia. In them the teeth are specialised for gnawing hard substances. There is usually only one pair of incisors in each jaw, but these are largely developed and are chisel-shaped. As they have enamel on their outer side only, use tends to keep the edges very sharp. They continue growing throughout life, so that if one of them is lost or destroyed, the opposite one continues to grow till it may enter the other jaw, or may so curve as to prevent the mouth from opening. In other cases it curves round and assumes the form of a monstrous tusk. The canine teeth are always absent, and there is a considerable gap between the incisors and the

molars. In most of the rodents the claws are blunt and usually somewhat broad, and the animal does not rest on them when walking.

As their dentition indicates, nearly all the rodents are strictly vegetarian in diet, roots, stems, and nuts constituting a large part of their food. The great majority of them burrow in the ground, though some are arboreal and a few aquatic. Hibernation is a common habit in this order, while many species store up large provisions of food for the winter. Among the rodents are included the squirrels, marmots, beavers, jerboas, rats, mice, hamsters, voles, lemmings, porcupines, agoutis, caviars, hares, and rabbits. They are world-wide in distribution. See *Capybara*; *Coypu*; *Musquash*, etc.

Rodent Ulcer. Form of cancer of the skin. It is generally restricted to elderly persons, and most frequently affects the face, particularly the forehead or the skin around the eye. The condition begins as a small papule which ultimately ulcerates. Progress is usually very slow and painless. Gradually, however, the ulceration increases until it may involve a large area of the skin and eat into the underlying structures. Treatment by X-rays, particularly in the early stages, is very effective, and as a rule complete cure can be obtained. For deeper growths treatment by radium or zinc introduced by the method of ionisation is often the best course. Where there has been much destruction of the deeper tissues, removal of the diseased structures by surgical



Rodent. Diagram showing arrangement of teeth in the hare

operation may be undertaken before treatment by X-rays or radium is adopted.

Roderic. Visigothic (West Gothic) king of Spain. His defeat by the Saracen Tarik at Jerez de la Frontera, near the Guadalete, put an end to his brief reign (710-711) and to the Gothic kingdom in that country. Nothing is known of his subsequent fortunes or of the date or manner of his death, and numerous legends have gathered round the name of Don Rodrigo.

Roderick (c. 1116-98). King of Ireland. Son of Turlough O'Connor (1088-1156), he succeeded his father as king of Connaught in 1156, and was crowned king of Ireland at Dublin in 1166. By a treaty with Henry II, 1175, Roderick acknowledged the English king as his overlord, retaining his hereditary kingship of Connaught. Deposed by his half-brother, Cathal, 1191, he died in monastic retreat at Cong, 1198. See *Ireland*: History.

Roderick Random. Novel by Tobias Smollett, published in 1748, in which he embodied much of his experiences as a naval surgeon's mate. The full title is *The Adventures of Roderick Random*.

Rodez. Town of France, capital of the dept. of Aveyron. It stands



Rodez, France. West front of the cathedral of Notre Dame

on a hill, 2,075 ft. alt., on the right bank of the Aveyron, 37 m. N.E. of Albi. The Gothic cathedral of Notre Dame, built between 1277 and 1535, has a tower 260 ft. high. There are manufactures of cloth, linen, and woollen materials, and a trade in cheese and cattle. Rodez was known as Segodunum and became capital of the Rutheni and later of Rouergue. Pop. 15,400.

Rodin, FRANÇOIS AUGUSTE (1840-1917). French sculptor. Born in Paris, Nov. 14, 1840, son of a government clerk, he studied drawing at a free school. His first important work, a bust named *The Man with the Broken Nose*, was rejected by the Salon, 1863, and in that year he became assistant to



Auguste Rodin, French sculptor

Carrier-Belleuse, whom he accompanied to Brussels, 1870. In 1875 he went to Italy, where he became intimate with the work of Michelangelo, Donatello, and other masters. Returning to France, 1877, his noble figure study, *The Age of Bronze*, made an impression.

Several of Rodin's greatest works were executed for commissions. The great Gate of Hell, undertaken for the Musée des Arts Décoratifs in 1880, occupied him for most of the latter part of his life, and supplied him with many themes which he worked out in separate pieces of sculpture. The Damvillers monument to Bastien-Lepage was completed in 1889;



Auguste Rodin. *The Burghers of Calais*, a group erected in Calais, 1895, of which a bronze replica is in the Victoria Tower Gardens, London. Top, right, *The Thinker*, placed in front of the Panthéon, Paris

the Nancy statue of Claude Lorrain occupied 1889-92. The Burghers of Calais group, commissioned in 1886, was completed in 1895; a replica of this characteristic group was erected in England in Victoria Tower Gardens, Westminster, in 1918. In 1905 Rodin presented twenty of his works to the British people in token of his admiration, bequeathing his remaining works to France on his death at Meudon, Nov. 17, 1917. *See Sculpture*; consult also Lives, R. Dircks, 1904; C. Maclair, Eng. trans. 1905; F. Lawton, 1906.

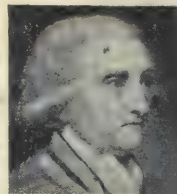
Roding. River of Essex, England. It rises about 2 m. N.W. of Dunmow, and flows 34 m. in a generally S.S.W. direction, to the river Thames, 2 m. S.E. of East Ham. The lower course has been canalised to Ilford. *See Roothings*.

Rodman, HUGH (b. 1859). American sailor. Born in Kentucky, Jan. 6, 1859, he passed through the naval academy, entering the navy in 1880. He served in the Spanish-American War, and in 1917 became a rear-admiral. During the intervening years he had been superintendent of transportation, Panama Canal. During the Great War he commanded a section of the Atlantic fleet, and later the squadron that served with the British Grand Fleet in the North Sea. In 1919 Rodman was made commander-in-chief of the Pacific fleet.

Rodney, GEORGE BRYDGES RODNEY, 1ST BARON (1719-92). English sailor. Born in London, Feb. 13, 1719, he entered the navy at the age of 14, and attained the rank of captain in 1742. Constantly at sea and with various commands, he

distinguished himself in the battle off Ushant, 1747, and subsequently served on the N. American station.

Promoted to flag rank in 1759, he bombarded Havre in that year, and in 1761, while in command of the Leeward Islands station, captured Martinique, Santa Lucia, Grenada, and St. Vincent. Made a baronet, 1764, he was governor of Greenwich Hospital, 1765-71.



1st Baron Rodney, English sailor
After Reynolds

Severely handicapped by poverty and by the refusal of the government to pay eight years' arrears of pay, Rodney spent some time in retirement, but in 1779 was reappointed to the Leeward Islands. He received orders to relieve Gibraltar, and this he performed by utterly defeating the Spanish fleet off Cape St. Vincent, Jan. 16, 1780. Proceeding to the West Indies, he fought several indecisive battles and was superseded in 1781. The following year he returned to the W. Indies, and defeated Grasse off Martinique, April 12, 1782. The French were routed, but Rodney refused to pursue. He was recalled, but was made a baron. He died May 23, 1792. The barony passed to his son George (1753-1802), whose descendant, George, became the 8th baron in 1909. *See Saints, Battle of the; St. Vincent*; consult also Lives, G. B. Mundy, 1830; D. Hannay, 1891.

Rodó, JOSÉ ENRIQUE (1872-1917). Uruguayan man of letters and publicist. The name of Rodó

—*el gran Rodó*—is famous throughout the whole Spanish speaking world as that of a great writer and thinker. He is the peculiar glory of the Republic



of Uruguay, in whose capital city, where he was born, his too brief life was spent. As a critic of literature his judgements were unerringly true; his philosophic writings, notably *Ariel* and *The Mirror of Prospero*, neither yet translated into English, take an optimistic and heroic view of life; "as clear as cut crystal" is a fellow critic's description of his literary style. An intense admirer of British institutions, he died in Sicily, May 3, 1917.

Rodosto OR TEKIR DAGH. Town and port on the Sea of Marmora, anciently known first as Bisanthe, and then as Rhædestum. It is about 80 m. W. of Constantinople, has a good roadstead, and does a considerable shipping trade in grain, canary seed, fruit, vegetables, silk cocoons, and silkworm eggs. Pop. about 42,000.

Rodrigues. Island of the Indian Ocean, one of the Mascarene group. It is 320 m. E.N.E. of Mauritius, of which it is a dependency, and is 18 m. in length and 7 m. in width, with an area of 40 sq. m. Of volcanic origin, and mountainous, its highest point is 1,400 ft. in alt. The soil is fertile and the climate healthy. The chief town and port is Mathurin, with a good harbour on the N. coast. There are two govt. schools. Rodrigues became British in 1814. It is a station of the Eastern Telegraph Co., whence the cable runs to Cocos-Keeling I. (q.v.). Pop. 6,000.

Roe, RICHARD. Imaginary name used in English legal procedure.

Roe, SIR THOMAS (c. 1581-1644). English explorer and ambassador. Born at Low Leyton, near Wanstead, Essex, and educated at Magdalen College, Oxford, and probably in France, he received an appointment at court in the last year of Queen Elizabeth's reign. He was knighted in 1605. In 1610 Prince Henry fitted him out for a voyage of discovery to S. America, and he sailed up the Amazon and to the Orinoco. He made two other voyages to the same quarter in quest of gold.

Roe was M.P. for Tamworth, 1614, and the next year was sent as ambassador to the court of the Mogul, where he obtained privileges for the English merchants which established the foundations of British supremacy in India. He was back in London in the autumn of 1619. Elected M.P. for Cirencester in 1621, he was sent in the same year as ambassador to Constantinople, where he rendered his country important services before returning to England in 1628. From 1638 to 1642 he was much on the Continent, taking part in the diplomatic negotiations that accompanied the Thirty Years' War. In 1640 he was made a member of the privy council, and returned to Parliament as member for Oxford University. He died at Bath, Nov. 6, 1644, and was buried at

Woodford, in Essex. Part of his journal as ambassador to the Mogul was published by Purchas, 1625, and the whole was issued by the Hakluyt Society, 1899, while a number of his letters were issued by the Camden Society, 1860.

Roebuck, JOHN ARTHUR (1801-79). British politician. Born at Madras, Dec. 28, 1801, he was edu-

cated in Canada. In 1831, having settled in England, he became a barrister, and in 1832 entered Parliament as M.P. for Bath. In the House of Commons he spoke frequently, and made his mark as a Radical and a critic of the government. In 1849 he was returned for Sheffield, and, except for the period 1868-74, he sat for that town until his death, Nov. 30, 1879. Roebuck was chairman of the committee appointed at his instigation to inquire into the mismanagement of the Crimean War. In foreign politics he did not always follow the usual Radical attitude; for instance, he supported the South in the American Civil War and Lord Beaconsfield in his Eastern policy. Intimate with Bentham and Mill, he wrote books on the colonies and the Whig ministry, and an Autobiography, published 1897.

Roedeer (*Capreolus capraea*). Small species of deer. It stands about 26 ins. high at the shoulder, and the colour of the pelt is reddish in summer and olive brown in winter, with a large white patch on the rump. The antlers are about 8 ins. long, and rise almost vertically from the head, usually with three short tines. The head is short and the ears rather large in proportion.

The roedeer occurs throughout most parts of Europe, and is indigenous in Great Britain. It occurs in many of the more secluded parts of the Highlands of Scotland, and is said to be still found in Cumberland.

Near Milton Abbas, in Dorsetshire, there is a considerable colony, and a few specimens are to be found in other districts. Roedeer frequent woods, visiting their feeding grounds in the open only in the early morning and evening. They are often troublesome in the neighbourhood of farms, and they do great damage in parks by gnawing the bark of the trees. See Deer.

Roehampton. Village and parish of Surrey, England. On the W. of Putney Heath, it once formed part of Putney and Mortlake Park, of which, in Charles II's time, the 2nd earl of Portland was lord keeper, and built, in addition to a mansion, Roehampton Park, the private chapel of which forms part of the parish church of Holy Trinity. The property passed by purchase to Christiana, countess of Devonshire, who held here a kind of salon, at which Thomas Hobbes was a familiar figure. Joshua Vaneck, afterwards Baron Huntingfield, pulled down the mansion and built Roehampton Grove. On part of the park was erected the convent of the Sacred Heart. Other buildings of note include Manresa House, a Jesuit college connected with S. Joseph's R.C. church; Dover House, Downshire House, Roehampton House, and, in Roehampton Lane, Queen Mary's Hospital, where soldiers maimed in the Great War are provided with artificial limbs and trained in handicrafts. In 1915-19 over 40,000 artificial limbs were supplied. During the Great War Roehampton was a headquarters for training of the dirigible balloon section of the R.A.F. See Artificial Limb.



John Roebuck, British politician



Sir Thomas Roe, English explorer



Roedeer. Male specimen of the small deer that occurs in some parts of Britain

W. S. Berridge, F.Z.S.

Roermond. Town of the Netherlands, in the prov. of Limburg. It lies on the right bank of the Meuse, here joined by the Roer, 28 m. by rly. N.E. of Maestricht, and is a rly. junction. It has industries in cloth and tobacco manufacture, and considerable traffic. The town is partly surrounded by promenades built on the site of the old fortifications. The 13th century minster contains some interesting carving and tombs. The cathedral of S. Christopher has three main towers and several noteworthy paintings. Fortified from the 13th century, Roermond changed hands several times during the wars against the Spaniards, who were finally expelled in 1702. In 1706 it became the capital of Austrian Gelderland, and from 1793-1814 was in French possession. The bishopric, founded 1561, was merged with that of Liège in 1801. Pop. 14,000. *Pron.* Roommond.

Rogation Days. Three fast days observed by the Roman Catholic and Anglican churches. They are the Monday, Tuesday, and Wednesday before Ascension Day, the preceding Sunday, the 5th after Easter, being known as Rogation Sunday. Mamertus, bishop of Vienne, is said to have instituted processions with litanies (Lat. *rogatio*, an intercession) on these days, on the occasion of earthquakes and volcanic eruptions in his diocese, about A.D. 467. The practice rapidly spread through the Western Church. In the Church of England, which has no special prayers for these days, the only survival of the processions are the perambulations of parishes, still maintained in some places, and known as beating the bounds. An old name for Rogation days is Gang days, from Anglo-Saxon *gangan*, to go, walk. *See* Bounds, Beating the; Litany.

Roger (1031-1101). Count of Sicily. Son of Tancred of Hauteville, Normandy, he assisted his brother, Robert Guiscard (*q.v.*), to conquer Calabria, 1057-62, and then crossed to Sicily, where he spent the next 30 years in subduing the Moslem rulers. His government of the island was generous and just, and the conquered Arabs eventually became his loyal subjects. On Robert's death in 1085, he succeeded to his dominions on the mainland, dying June 22, 1101.

Roger (c. 1093-1154). King of Sicily. Son of Count Roger, he was an ambitious man, and in 1127 claimed Apulia, the throne of which was vacant by the death of his cousin William. Invested duke of Apulia in 1128, he extended his authority through the S. of Italy,

and, as a reward for supporting Pope Anacletus II against his rival, Innocent II, Roger was made king of Sicily. Fiercely subduing insurrection in Sicily and resisting the war-like advances of rival powers from the N., he attacked the Byzantine empire, 1146, ravaged Greece and Dalmatia, and in 1147 conquered parts of N. Africa. He maintained a splendid court, and governed his dominions well. He died Feb. 26, 1154.

Rogers, HENRY (1806-77). British divine. Born at St. Albans, Oct. 18, 1806, the son of a surgeon, he was educated at Highbury College for the Nonconformist ministry. After a few years passed in charge of a church at Poole, he was appointed in 1836 professor



Henry Rogers,
British divine

of English literature at University College, London. In 1839 he became professor at Spring Hill College, and in 1858 principal of Lancashire Independent College. He retired in 1871, and died Aug. 21, 1877. A powerful thinker, Rogers exercised great influence over his pupils and by his writings, of which *The Eclipse of Faith* is the best known. He contributed much to *The Edinburgh Review* and *The British Quarterly*, and edited the works of John Howe.

Rogers, JAMES EDWIN THOROLD (1823-90). British political economist. Born at West Meon, Hampshire, and educated at King's College, London, and Magdalen Hall, Oxford, he took orders and worked as a parish priest until 1860, when he threw up his profession and devoted himself to teaching and the study of political economy. While living in Oxford, he was four times examiner in classics, and published verse translations from Euripides, Horace, and Juvenal. In 1859 he was appointed Tooke professor of statistics and economic science at King's College, London, a position which he held until his death at Oxford, Oct. 12, 1890. His greatest work, the *History of Agriculture and Prices in England*, was begun in 1860, the first two volumes being published in 1866, and his reputation was



J. Thorold Rogers,
British political
economist

recognized in 1862 by his appointment for five years as Drummond professor of political economy at Oxford. From 1880-86 he was in Parliament as a Gladstonian Liberal, and in 1888 was re-elected Drummond professor at Oxford.

His *History of Agriculture* is a monumental record of research for the English period, 1259-1793. It was supplemented by the important *Six Centuries of Work and Wages*, 2 vols., 1884.

Rogers, JAMES GUINNESS (1822-1911). British divine. Born at Enniskillen, Dec. 29, 1822, the son of the Rev. Thomas Rogers, he was educated at a school at Wakefield, at Trinity College, Dublin, and for the ministry at Manchester. In 1846 he



J. Guinness Rogers,
British divine

became minister of a Congregational church at Newcastle-upon-Tyne, afterwards having charge of churches at Ashton-under-Lyne (1851-65), and Grafton Square, Clapham (1865-1900). He died Aug. 20, 1911. Rogers was perhaps better known as a political speaker than as a preacher. A strong Liberal and a friend of Gladstone, he was one of the champions of Nonconformist and Liberal causes.

Rogers, SAMUEL (1763-1855). British poet. Born at Stoke Newington, July 30, 1763, he entered his father's bank as a youth, and became head of it in 1793. His leisure was devoted to the cultivation of literature, and by 1792 he had established his fame as a poet with the very successful *Pleasures of Memory*. About this time Rogers took rooms in the Temple and soon had a large circle of acquaintances among the leading literary men of the day. The circle was further extended when he withdrew from active management of the bank.

Rogers's breakfasts became famous, the conversational powers of the host himself contributing not a little to their success. Among his friends were numbered Byron, Campbell, Moore, Wordsworth, Jeffrey, Fox, and Sheridan. At St. James's Place, also, he began to amass the magnificent art collection and library which after his death were sold for £50,000. Exceedingly fastidious in his work, Rogers's literary output was comparatively small. His poems include, in addition to *The Pleasures of Memory*, *Columbus*, 1810, a fragment of an epic, *Jacqueline*, 1814,

Human Life, 1819, probably the best of his works, and Italy, 1822, the third edition of which, published in 1830, was illustrated by Turner and Stothard. The lack of original genius in his works is compensated for by his exquisite taste and laborious artistry. Personally Rogers was one of the kindest and most benevolent of men, though his amiable qualities were somewhat obscured by his caustic wit. He died Dec. 18, 1855. See Rogers and his Contemporaries, P. W. Clayden, 1889; S. Rogers and his Circle, R. E. Roberts, 1910.

Roger's Pass. Mountain pass in Canada, in British Columbia. Here the C.P. Rly. crosses the Selkirk Mts. Its altitude is 4,275 ft.

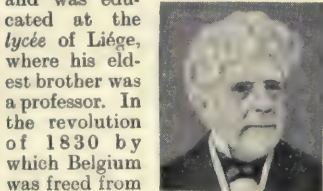
Roget, PETER MARK (1779-1869). Anglo-Swiss scientist. Born in London, Jan. 18, 1779, and



Peter Mark Roget, Anglo-Swiss scientist

educated for the medical profession at Edinburgh University, he had a long and busy career, first in Manchester and afterwards in London, as a physician and lecturer on physiology and other medical subjects. A versatile and industrious man, with a strong scientific bent, Roget helped greatly in the establishment of the university of London, in which he retained his interest throughout his life. He is chiefly remembered, however, by his enormously popular Thesaurus of English Words and Phrases, 1852, revised by A. Boyle, 1912, a work that has proved of great value to journalists and other writers. He died at West Malvern, Sept. 12, 1869. *Pron.* Rozh-ay.

Rogier, CHARLES LATOUR (1800-85). Belgian statesman. He was born at St. Quentin, Aug. 12, 1800,



Charles Rogier, Belgian statesman

and was educated at the *lycée* of Liège, where his eldest brother was a professor. In the revolution of 1830 by which Belgium was freed from Holland, he raised a company of men of Liège and took an active part in the fighting in Brussels in September, afterwards becoming a member of the provisional government and then of the National Congress. Minister of the interior in 1832 and of public works in 1840, he was anti-clerical

and anti-republican, supporting the constitutional monarchy. He was twice governor of Antwerp and the head of the Liberal ministries of 1847-52, and from 1857-68. As minister of foreign affairs in the latter period he strengthened the good relations of Belgium with France, and negotiated a treaty of commerce between the two countries. He also obtained from Holland and Great Britain the suppression of the Schelde tolls which hampered the commerce of Antwerp. He died in Brussels, May 27, 1885. See Life, E. Descailles, 1896. *Pron.* Rozh-yay.

Rogue. Term used for a dishonest person, also for a vagrant. Rogue money is a phrase used in Scotland for the money levied in each county to meet the cost of catching, prosecuting, and maintaining criminals. See Vagrancy.

Rohan-Gié, HENRI, DUC DE (1579-1638). French soldier. Born at Blain, Brittany, Aug. 21, 1579,



Duc de Rohan-Gié, French soldier

he was educated as a Protestant and served his kinsman Henry IV at the siege of Amiens, 1597. Created duke in 1603, he attended the Protestant assembly at Saumur, 1611, and became leader of the Calvinist party, fighting against Louis XIII in Béarn, 1620. Raising the sieges of Montauban and Montpellier, 1622, he helped to secure the confirmation of the edict of Nantes, 1623, and became governor of Nîmes and Uzès. He fought against Richelieu at La Rochelle, and after the peace of Alais, 1629, retired to Venice and wrote his memoirs. He commanded a French corps against Austria, 1635-36, and wounded while fighting for the Protestants at Rheinfelden, Feb. 28, 1638, died, April 13, at Königsfeld.

Rohan-Guéméné, LOUIS RENÉ ÉDOUARD, PRINCE DE (1734-1803). French cardinal. Born in Paris, Sept. 25, 1734, he was educated at the seminary of S. Magloire, and became coadjutor to his uncle Constantin, bishop of Strasbourg, 1760. He was admitted to the Académie Française, 1761, and in 1772 went to Vienna as ambassador. His

extravagant luxury there displeased Maria Theresa, who secured his recall, 1774. He became cardinal, 1778, and bishop of Strasbourg, 1779. He fell into disgrace on account of his implication in the affair of the diamond necklace (*q.v.*), 1785, and was arrested, but on release returned to Strasbourg. He died at Ettenheim, Feb. 17, 1803.

Rohilkhand. Dist. of India, now part of Oudh. It owes its name to the Rohillas, who were crushed by some British troops in 1774. It then became part of Oudh and was annexed by Great Britain in 1801. See India; Oudh.

Rohilkhand. Division of the United Provinces, India. It is situated E. of the Ganges and W. of Nepal at the foot of the Himalayas. Its area is 10,829 sq. m. Pop. 5,651,000.

Rohilla. British hospital ship. She was wrecked off the Yorkshire coast, near Whitby, on Oct. 30, 1914, 70 lives being lost.

Rohilla. People of Afghan race. Early in the 18th century they came down from the borders of Afghanistan and settled in a territory to the N.W. of Oudh, to which the name Rohilkhand was given. There they came into conflict with the Marathas, against whom they secured the help of the nawab of Oudh, Suraj-ud-Dowlah. For this assistance the Rohillas promised 40 lacs of rupees to the nawab who had apparently got rid of the Marathas by a monetary payment. The Rohillas only discharged a portion of their debt, whereupon the nawab made a bargain with Warren Hastings, who, in return for a sum of money paid to the E. India Co., promised to send a force against the Rohillas. The result was the short Rohilla war of 1774 in which the tribesmen were quickly crushed. His conduct in this matter was one of the charges on which Hastings was impeached. See Hastings, Warren; Suraj-ud-Dowlah; consult also Short History of the British in India, A. D. Innes, 1902.

Rohlf, FRIEDRICH GERHARD (1831-96). German explorer. Born at Bremen, April 14, 1831, he served in the Slesvig-Holstein campaign and then studied medicine and joined the French foreign legion as a surgeon. After serving in Morocco, 1861-62, he disguised himself as an Arab and made various desert explorations. In 1863 he reached the oasis of Tuat, and in 1865 he crossed Tripoli, S. Bornu, and Sokoto, and eventually made his way to the Guinea coast. From 1868-75 he made other explorations in the African deserts, which he described in various



Prince de Rohan-Guéméné, French cardinal

books, of which the best known are *Reise durch Marokko*, 1868; *Land und Volk in Afrika*, 1870; *Reise von Tripolis nach der Oase Kufra*, 1881. He died June 2, 1896.

Rohtak. Dist. and town of the Punjab, India, in the Ambala division. The dist. lies W. of the Jumna and N.W. of Delhi; the Sonapat subdivision was added to the dist. on the partition of the Delhi division. The chief tribesmen are Jats. The rainfall is 29 ins. per annum, and the chief crops are native food grains, as bajra, although some cotton and sugarcane are grown. Its area is 1,800 sq. m. The town, which is of great antiquity, occupies a central position in the dist. and is on the rly. N.W. from Delhi. Pop., dist., 541,000; town, 20,400.

Roi Fainéant (Fr., do-nothing King). Term applied to the last seven Frankish kings of the Merovingian dynasty. They were so called because the officials known as the mayors of the Palace, at first servants of the king, had gradually assumed all the power of their nominal masters. See Franks; Merovingians.

Roisel. Village of France, in the dept of Somme. It is 9 m. E. of Péronne (q.v.), on the Cologne river. It was reached and entered by British cavalry in March, 1917, following the German retreat on the Somme. In Nov., 1917, the Lancashire 55th div. bore the brunt of the German counter-attack, after the initial British success at Cambrai, and here the Americans first appeared in the Allied battle line. In March, 1918, the British 66th div. made a great stand at Roisel. Roisel was recovered by the Allies in the autumn of 1918. See Somme, Battles of the.

Rokeby. Village of Yorkshire (N.R.), England. It stands where the Greta falls into the Tees, 3 m. from Barnard Castle. It owes its fame to Scott's poem. S. Mary's Church is the chief building. A Roman road ran through it and Roman remains have been found. The family of Rokeby, who gave their name to the place, had their castle at Mortham in the parish. Pop. 150.

Rokeby. Romantic narrative poem, by Sir Walter Scott, published in 1813. The scene is Rokeby in Yorkshire, where the poem was written, and the period is July, 1644, immediately after the battle of Marston Moor.

Roland. Trade name applied to aeroplanes built by the Luftfahrzeug Gesellschaft, of Adlershof, near Berlin. Roland aircraft were built in large numbers during the Great War, and were used by the

enemy on the W. front, mostly in the form of single-seater fighting machines.

Roland. Masculine Christian name. Of Teutonic origin, it means fame of the land. An Anglo-Welsh variant is Rowland, while the Italian form is Orlando.

Roland. Frankish soldier, celebrated in legend as the greatest of Charlemagne's paladins. The historic Roland or Hruodland was an obscure warden of the Breton marches, who was slain by the Basques when they overwhelmed the rearguard of Charlemagne's army on its return from an expedition against the Moors of Spain in 778. The attack, which was made at Roncesvalles in the Pyrenees, was in retaliation for the wanton capture of Pampeluna. Popular tradition, embodied in the Song of Roland and other poems, transformed Roland into a national hero, the nephew of Charlemagne, and his assailants into Saracens. As Orlando, Roland is the hero of Ariosto's *Orlando Furioso* and Boiardo's *Orlando Innamorato*.

Roland. SONG OF (Fr. *Chanson de Roland*). National French epic, the oldest and finest of the extant *chansons de geste* (q.v.). Written probably by a Norman, between 1066 and 1099, it consists of 4,001 ten-syllabled lines, grouped by assonance into sections. Based on distorted memories of the disaster at Roncesvalles, it is thoroughly heroic in spirit, and its austere, direct style, devoid of superfluous ornament, has little in common with the romantic manner of later poems. It tells how Charlemagne, after conquering Spain, accepts the feigned submission of the Saracen king, Marsile. See Charlemagne; consult also ed. with modern French version by L. Gautier, Eng. trans. Scott-Moncrieff, 1920.

Roland de la Platière, MARIE JEANNE PHILIPON (1754-93). French memoir and letter writer and revolutionary leader. She was the daughter of an engraver named Philipon, was born in Paris, March 18, 1754, and in 1780 married

Roland de la Platière, husband and wife becoming prominent among the Girondist leaders. Madame Roland's letters and memoirs throw much light on the period, and reveal her as one of the finest characters and one of the most brilliant intellects of her time. She was guillotined in Paris, Nov. 8, 1793. Her last words have be-



Madame Roland de la Platière. From a drawing made at the Conciergerie prison, while she was awaiting execution

come famous: "Oh, Liberty, what crimes are committed in thy name!" Her *Mémoires*, first published in 1820, and her *Lettres*, 1867, have been many times reissued. There was a new edition of the letters, edited by C. Perroud, 1900-2, and of the *Mémoires*, 1905. See Madame Roland, M. Blind, 1886; *Four Frenchwomen*, A. Dobson, 1890; *Madame Roland*, I. M. Tarbell, 1896; *Life of Madame Roland*, I. A. Taylor, 1911.

Rolfe, WILLIAM JAMES (1827-1910). American scholar. Born at Newburyport, Massachusetts, he was headmaster of several schools, but is chiefly remembered for his editions of the poets, especially of Shakespeare, 40 vols., 1870-83, new ed. 1903-7; and Tennyson, 12 vols., 1895-98. His Shake-

speare the Boy, 1896, was followed in 1904 by a *Life of the poet*, and in 1908 by *Shakespeare Proverbs*. His son, John Carew Rolfe (b. 1859), is known as a classical scholar, and held professorships at Harvard and at the American School of Classical Studies in Rome.



Rokeby, Yorkshire. The old hall where Sir Walter Scott conceived the idea of his poem

Frith

Roll (Lat. *rotula*, a little wheel). Something that turns like a wheel. It has come to be used for that which is rolled, e.g. a roll of paper, or anything else that is wound upon a roller. In music, by analogy, a roll is the continuous vibration of the drum head obtained by rapid strokes of the drum sticks, usually indicated either as a trill *tr* or as a tremolo *tr*. There are several kinds of rolls on the side-drums, according to the way in which the sticks are used.

Roll, ALFRED PHILIPPE (1847-1919). French painter. Born in Paris, March 10, 1847, he followed at first the romantic style of Gérôme, and first exhibited at the Salon in 1870. One of the pioneers of open-air painting, he attracted attention with his military subject, *Halte-là*, 1875, and his striking *Grève des Mineurs*, 1880. He has painted many portraits and pictures of public occasions, and examples of his able, if academic, work may be seen at Versailles, the Hôtel de Ville, Paris, and in several French provincial collections. He became president of the Société des Beaux Arts, 1905. He died Oct. 27, 1919.



Alfred Roll,
French painter

Rolland, ROMAIN (b. 1866). French author. Born at Clamecy, Nièvre, Jan. 29, 1866, he early devoted himself to literature, became professor at the Sorbonne, and won wide reputation by his writings for the stage, criticism, fiction, and biography. The thesis



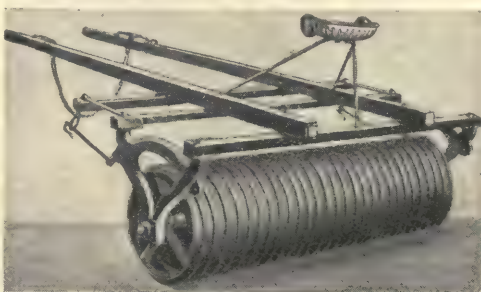
Romain Rolland,
French author

which he wrote for his degree, *Les Origines du Théâtre Lyrique Moderne*, 1895, was crowned by the French Academy. His plays, *Aér*, 1898; *Le Triomphe de la Raison*, 1898; *Danton*, 1901; and *Le 14 Juillet*, 1902, while full of interest, were not greatly successful, and he turned to other literary fields, especially to the history and interpretation of music, and produced a rapid succession of notable works, including *Le Théâtre du Peuple*, 1904 (Eng. trans. 1919); critical biographies of Beethoven, 1903; Michelangelo, 1907 (Eng. trans. 1912); Handel, 1916; and Tolstoy, 1911 (Eng. trans. 1911); *Musiciens d'Autrefois*, and *Musiciens d'Au-*

jourd'hui, 1908 (both translated into English, 1915); *L'Humble Vie Héroïque*, and *Les Maîtres de la Musique*, 1912.

While producing these books Rolland had also been engaged upon his masterpiece, *Jean-Christophe*, which was published in ten volumes, 1905-12 (Eng. trans. 1911-13). This work, described by the author as "the tragedy of a generation that had disappeared," presents the story of a young musician of genius, but is not so much a novel as a rambling romance in which the author philosophises over many things; it is a novel only in the sense that Goethe's *Flower, Fruit and Thorn Pieces* are novels. Rolland was indeed a close student of the Germans, and his articles published in the *Journal de Genève*, Sept.-Oct., 1914—"you know well I love your old Germany"—created something of a sensation in France, where his philosophic pacifism met with little sympathy. Rolland received the Nobel prize for literature, 1915. See French Novelists of To-day, W. Stephens, 1915; Romain Rolland, S. Zweig, Eng. trans. E. and C. Paul, 1921.

Roll-Call. Term applied to the calling over of a list of names, especially of soldiers or students, to ascertain how many of the full number are present. A famous battle-picture with this title, by Lady Elizabeth Butler (*q.v.*), was first exhibited in 1874. In some of the public schools the answer to the roll-call, known at Harrow as bill,



is the Latin *adsum*, I am present.

Roller. An implement used for levelling or compressing the soil, and also for breaking up clods. For the latter purpose the roller should have a fluted or toothed surface, and is then distinguished as a clod-crusher. An

ordinary smooth roller may be of wood, stone, or iron. The first kind is little used, though capable of good work where great weight is unnecessary. Stone rollers are too heavy, and are seldom seen. Iron rollers are commonly made in sections, and vary in size according to the class of work. Rolling is of importance in the preparation of a fine seed-bed, while after a crop is sown the operation promotes even germination by producing a level surface and consolidating the soil. See Road; Steam Roller.

Roller. Group of birds, including several genera, which are widely distributed throughout the E. hemisphere. In general appear-



Roller, the blue species which visits Great Britain

ance they resemble crows, but have plumage of very brilliant colours. One species, the blue roller (*Coracias garrula*), breeds in S. Europe, and occasionally visits Great Britain. It is like a jay, has chestnut brown and blue plumage, and is about 12 ins. in length. The name is derived from the peculiar habit of these birds of

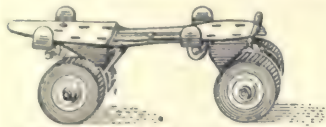
appearing to lose balance and roll over when in flight, especially by the males during the court-ing season. The name roller is also given to certain varieties of tumbler pigeons, e.g. Oriental roller. See Pigeon.



Roller. Sectional field roller, composed of a series of narrow cylinders revolving independently on the axle. Top, fluted field roller

By courtesy of J. & F. Howard, Ltd., Bedford

Roller-Skating. Pastime of skating on wheels, usually on a floor of polished wood or cement.



Roller-Skating. Ball-bearing 4-wheel type of roller-skate

This form of skating was in vogue in the United Kingdom as early as 1800, but was not publicly exploited until 1815, at the Floral Hall, Covent Garden, London. At first a fixed axle type of skate was used, but with the inclined axles principle and four wheels to each skate, introduced from America in 1863, the execution of figures on roller-skates became possible. In 1879 the National Skating Association was formed to promote the sport; and in 1890 the Olympia hall, at West Kensington, was opened as a roller-skating rink. With the advent of the ball-bearing skate the pastime increased in favour. See Rink; Skating.

Rolleston. Parish of Staffordshire, England. It stands on the Dove, $3\frac{1}{4}$ m. from Burton-upon-Trent, with a station on the N. Staffs. Rly. In it is the township of Anslow. The old church of S. Mary, restored in the 19th century, contains monuments of the Mosleys. Rolleston Hall, standing in a fine park, is the seat of Sir Oswald Mosley, Bart., but much of the estate was sold in 1919. Here Sir Oswald Mosley introduced the manufacture of standard bread. Pop. 900.

Rolleston, THOMAS WILLIAM (1857-1920). Irish author. Born at Glasshouse Shinrone, King's



Thomas W. Rolleston,
Irish author
Elliott & Fry

County, he was educated at Rathfarnham and Trinity College, Dublin, and spent four years in Germany. He then edited *The Dublin University Review*, 1885-86,

wrote for the Dublin and London press, and published a *Life of Lessing*, 1889. He worked for several organizations for the development of Irish arts and crafts, industries, and trade. At the same time he established his reputation as an interpreter of Irish literature, editing with his father-in-law, Stopford A. Brooke, *The Treasury of Irish Poetry*, 1900, and writing *Imagination and Art in Gaelic Literature*, 1900, and *Myths and*

Legends of the Celtic Race, 1911. His other works include *Parallel Paths: a Study in Biology, Ethics, and Art*, 1908, and a volume of poems, *Sea Spray*, 1909. He died Dec. 5, 1920.

Rolliad, THE. Political satire in verse and prose, published in two parts in *The Morning Herald*, 1784-85. Its full title is *Criticisms on*



Roller-Skating. Champion skater doing the change bracket figure

the Rolliad, and the skit comprised extracts from an imaginary epic poem, these giving opportunity for caustic comments on contemporary men and matters. The immediate occasion of the satire was a speech made by Col. John (afterwards Lord) Rolle (1750-1842) on the Westminster Scrutiny, when the government attempted to unseat Fox; but the attack was mainly directed against Pitt and the members of his government. The Rolliad, a brilliant ephemeral performance, was the production of several witty men of fashion belonging to the Whig party.

Rollin, CHARLES (1661-1741). French historian. Born at Paris, Jan. 30, 1661, he was educated at the Collège du Plessis and studied theology. He became professor of eloquence at the Collège de France, 1688, rector of the university, 1694-96, and principal of the college of Beauvais, 1699-1712. He there exercised great intellectual influence, but was accused of Jansenism and obliged to retire, and continued to teach at the Collège de France. His writings

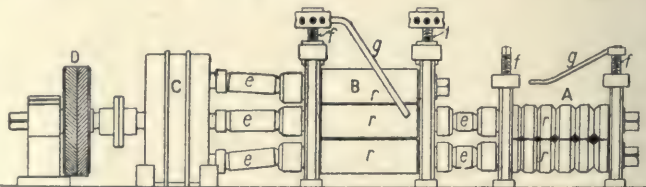
include the *Traité des Études*, 1726-28; *Histoire Ancienne*, 1730-38; and the uncompleted *Histoire Romaine*, 1738. He died Sept. 14, 1741. His complete works were edited by Guizot, 1821-27.

Rollinat, MAURICE (1853-1903). French poet. Born at Châteauroux, Indre, he occupied an administrative post in Paris, and early showed literary and musical abilities. His father was a friend of George Sand, and he himself was deeply influenced by Poe and Baudelaire. His first book, *Dans les Brandes*, 1877, attracted little notice, but *Les Névroses*, 1883, drew wide attention by its macabre quality. Rollinat then retired to a country life, and published, among other works, *L'Abime*, 1886, and *La Nature*, 1892. He died Oct., 1903.

Rolling Mill. Machine used for rolling plates, sheets, bars, angles, etc., from billets of metal. The simplest form of rolling mill consists of two cast-iron cylinders, mounted in standards or housings through which by screws the distance between the rolls can be adjusted. Suitable gearing ensures that the two rollers revolve uniformly with one another. They are driven, through further gearing, by a driving engine. The rollers may either be reversed in their action or there may be three rollers, the plate or bar of metal passing through the middle and lower roller on one journey and through the middle and upper on the return, thus obviating the delay due to reversing in a two-roller mill. The whole action of rolling has to be done gradually on account of the great stresses set up, the steel ingots, etc., usually being raised initially to a white heat and reduction taking place down to red heat. For the rolling of sectional forms, e.g. railway rails, H-section girder forms, etc., the rollers are grooved.

Rolling Stock. Name given to the engines, carriages, wagons, trucks, etc., of rly. and tramway companies. See Railways.

Rollo, ROLO, OR ROU (c. 860-932). Duke of Normandy. Son of Rögnvald of Norway, he left Norway about 875, took part in invasions of Scotland and England,



Rolling Mill. Diagram of 2-high bar mill and 3-high plate mill. A. Bar mill. B. Plate mill. C. Gear box. D. Driving wheel. e. Mill couplings. r. Rolls. f. Pressure screws. g. Handles for screwing up rolls

and sailed up the Seine to Jumièges and Rouen, 876. Fortifying Rouen, he extended his power in Neustria, besieged Paris, 886, and captured Évreux, Bayeux, etc. By the treaty of St. Clair-sur-Epte, 911, Rollo was baptized as Robert at Rouen, his capital, is said to have married Gisele, daughter of the king, and received the territory thereafter called Normandy and the suzerainty of Brittany. His strong, able rule brought prosperity, and, abdicating power to his son William in 927, he died in 932.

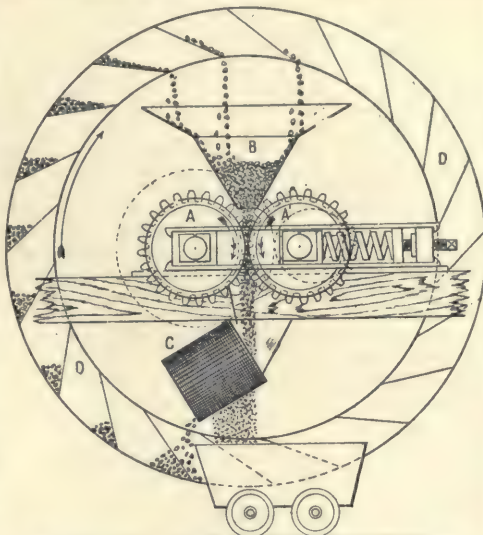
Rollo, BARON. Scottish title borne by the family of Rollo since 1651. Sir Andrew Rollo, whose estates were at Duncrub, Perthshire, was the first holder, Charles II creating him a baron during his stay in Scotland in 1651. Robert, the 4th baron, was concerned in the Jacobite rising of 1715, and from him the title passed from one descendant to another until in 1916 it came to William Charles, as 11th baron. Lord Rollo sits in the Lords as Baron Dunning, a title created in 1869. The seat is Duncrub Park, Dunning, Perthshire.

Roll of Honour. The heading given to the casualty lists as they appeared day by day in the press during the Great War. Besides the main roll nearly every town and village, and every large industrial undertaking, every large office, every large school, had its roll of honour, giving the names of those who served and of those who suffered in the War. An official publication in 89 volumes containing the names of soldiers who died in 1914-19 was begun in 1920. (See Casualties.)

The term is sometimes used for the national roll of honour, called also the King's National Roll (q.v.).

Rollright, GREAT AND LITTLE. Two villages of Oxfordshire, England. They are situated in the Cotswold Hills, 3 m. N. and N.W. respectively of Chipping Norton, and have a total pop. of about 400. Half a mile from Little Rollright, on the county boundary, are the Rollright Stones, the most important megalithic remains in England after Stonehenge. The isolated King's Stone and the clustered Whispering Knights are the chief stones left.

Rolls, CHARLES STEWART (1877-1910). British engineer and airman. Born in London, Aug. 28, 1877, a youngson of the 1st Baron Llangattock, he was educated at Eton and Trinity College, Cambridge, where he was a prominent cyclist. After some engineering work at Crewe, Rolls devoted his time to popularising the motor-car in England. He competed in races,



Rolls Ore Crusher. Diagram illustrating the type in use in the Cornish copper mines. A A'. Rolls. B. Hopper holding ore. C. Rotary sieve delivering fine crushed ore to wagon and coarse ore to elevator, D, which returns it to the rolls to be recrushed

investigated new designs, and formed for their manufacture the company which became Rolls-Royce, Ltd.



Charles Stewart Rolls,
British engineer

Elliot & Fry

About 1901 he turned his attention to aeronautics, and, making many daring flights, was soon one of the best known of British airmen. He won several trophies, and in 1910 crossed and recrossed the English Channel in 95 minutes, then a notable feat. He was killed while flying at Bournemouth, July 12, 1910. There is a statue to him in the market square at Monmouth.

Rolls Chapel. Old London building. It stood in Chancery Lane, E.C., on ground now covered by the W. part of the Public Record Office (q.v.). The original chapel and house were built by Henry III in 1233 for converted Jews and their governor or master. In 1377 buildings were assigned to the master of the rolls, who held his court here until 1882, and was known until 1873 as keeper of the house of converts. The chapel was rebuilt by Inigo Jones in 1617, and Rolls House in 1717-25. Donne, Burnet, Atterbury, and Joseph Butler were among the preachers in the chapel, interesting monumental remains from which, including the tomb of

John Young, master of the rolls to Henry VIII, are in the Record Office museum, with which parts of the old chapel were incorporated in 1896-97.

Rolls Ore Crusher. Machine used for crushing ore. Rolls were probably first used at the tin and copper mines of Cornwall. A typical Cornish crushing mill consists of two horizontal rollers, 2 ft. in diameter and 10 ins. wide on the face, fixed in a frame with their rounded surfaces just, or not quite, touching; they revolve in opposite directions at the same speed. One

revolves in fixed bearings, and the other in sliding bearings; the pair are kept up to their work by means of long levers with heavy weights on their outer ends, and the others connected with the sliding bearings of the free roll.

The weights determine the pressure with which the rolls are forced together, and, therefore, the fineness of the crushing or the quantity of ore passed per hour. The ore is fed into a hopper or bin fixed over the rolls, and after it has passed through is sieved, and the coarser portions returned to the rolls to be crushed again. In more modern mills the rolls may have wider faces, springs take the place of weighted levers, and more compact arrangements may be made for returning the partly crushed ore to the rolls. The Krom rolls, largely used in the U.S.A., are merely improved Cornish mills. Mills with toothed rolls, such as are used for making cubes of stone for macadam or concrete, are sometimes used for the preliminary crushing of the ore.

Rolls-Royce Aero Engine. Type of engine developed and manufactured during the Great War by Rolls-Royce, Ltd. It is made in four sizes, the Hawk (75-100 h.p.), the Falcon (190-275 h.p.), the Eagle (250-375 h.p.), the Condor (650 h.p.). The Hawk engine is a small six-cylinder vertical engine driving an air-screw direct; the remaining three types are all 12-cylinder engines with two rows of six cylinders inclined

at an angle of 60 degrees one to the other, and driving the air-screw through an epicyclic reduction gear.

The first three engines all played an important part in the war—the Hawk for training purposes, and the Falcon and the Eagle on war machines. The Condor engine had not passed the experimental stage when the Armistice was signed. Since the conclusion of hostilities the Rolls-Royce engine has added to its long list of achievements by propelling the Vickers-Vimy machine which made the first non-stop flight from America to Ireland.

Rolls Series. Name given to the editions of the works of the early English historians, and to other historical documents published under the direction of the master of the rolls. In 1857 Sir John Romilly, then master, was authorised to begin the publication of the series, and it was decided to treat each chronicle or collection of documents as a separate work. By 1914 no fewer than 99 separate works had appeared in 251 volumes, these including the chronicles of Matthew Paris, Roger of Hoveden, and others, as well as public records of various kinds. Introductions were written by the editors, some of which, notably those by Bishop Stubbs, are valuable contributions to historical knowledge. See Record Office.

Roma. Town in Roma co., Queensland, Australia. It is on the Warrego river, 318 m. by rail W. of Brisbane on the line to Charleville and Cunnamulla. It is in a pastoral dist. Pop. 3,200.

Roma. Personification of the imperial power of Rome. She was worshipped both in Rome and Asia Minor, where the first temple was built in her honour at Smyrna in 195 B.C. On Roman coins, she was represented as a warlike heroine, leaning on a shield, with the goddess of victory on her right. A temple of Venus and Roma was erected in Rome by Hadrian. See Marcus Aurelius; illus. Palatine Hill.

Romagna. Name of the N.E. part of the former Papal States, Italy. The area now comprises the modern provs. of Bologna, Ferrara, Ravenna, and Forlì, all in the compartimento of Emilia. It was acquired by the popes in 1278, was surrendered by them in 1797, and was joined to Piedmont in 1860. Area, 3,929. Pop. 1,500,000.

Romagne. Village of France in the dept. of Meuse. It is 4 m. N. of Montfaucon and is sometimes known as Romagne-sous-Montfaucon. It was prominent in the fighting in the Meuse-Argonne area in the Great War, and was specially associated with the American cam-

paign there in 1918, being captured by the 32nd U.S. div. on Oct. 14, 1918. Up to Mar. 1, 1921, there was a great American cemetery here, containing the graves of 22,000 soldiers who fell in the Argonne, but on that date the work of transporting the bodies to America was begun. See Argonne, Campaign in the; Meuse-Argonne.

Roman OR **ROMANU.** Town of Moldavia, Rumania, the chief town of a department of the same name. It stands at the confluence of the Moldava and the Sereth,

about 35 m. S.W. of Jassy. It has a fine cathedral, built in 1541, and a handsome bridge across the Moldava, and is the seat of a Greek bishop. Pop. 14,000. The area of the prov. is 810 sq. m., and its population 128,000.

Roman Candle. Species of firework. The powder is contained in a cardboard tube. A continuous shower of sparks follows ignition, brilliant balls of fire being ejected at intervals. This type of firework was first made in Italy, hence its name. See Fireworks.

THE ROMAN CATHOLIC CHURCH

Canon W. F. Barry, Author of *The Papal Monarchy*, etc.

In asking a distinguished Roman Catholic scholar to write this article it was assumed that, although the point of view might be sympathetic, the expression should be impartial. It will be read in that light. See the article Protestantism for the other side of the question. See also Christianity; Eucharist; Jesuits; Monasticism; the articles on the saints and fathers of the Church; also Papacy and biographies of the popes; and entries on Cope and other vestments

The compound term Roman Catholics is not admitted, save by accident or under protest, in documents emanating from the authorities of the institution thus described. The Vatican Council of 1870, in its decree *Dei Filius*, speaks of the "Holy Catholic Apostolic Roman Church"; and these words take us back to the Nicene Creed (325-379), beyond which the Apostles' Creed, of still higher antiquity, bears witness to primitive belief in the Catholic Church, as founded by Jesus Christ, and commissioned to teach all nations (*Matt. xxviii, 19, 20*).

S. Irenaeus, bishop of Lyons, speaks of Rome as "the greatest church, the most ancient and conspicuous, founded and established by Peter and Paul"; he declares that "to this Church every Church, that is, the faithful from every side, must resort on account of the more powerful primacy." S. Cyprian, who pleaded with eloquence for the "unity of the Catholic Church," calls Rome "the see of Peter and the principal Church, whence the unity of the priesthood took its rise."

Early Popes

S. Irenaeus and others give catalogues of the popes immediately following—Peter to their own times. S. Silvester confirmed the Nicene decrees of 325; S. Celestine dictated those of Ephesus of 431; S. Leo the Great's "Tome," or dogmatic letter, was accepted by the six hundred bishops at Chalcedon, in 451, who acknowledged him to be "keeper of the vine," and "archbishop of the whole world."

None of the early heretics could persuade the popes to show them favour; while saints of the

East, like Athanasius, Basil, John Chrysostom, and Cyril of Alexandria, made appeal to them in support of the Catholic creed. S. Jerome, by far the most learned among orthodox writers in the first six centuries, asks in controversy with Rufinus, "what does he call his faith? If he answer Roman, then we are Catholics"; and to Pope Damasus he writes, "I who follow none but Christ am in communion with the Beatitude, that is to say, with the See of Peter. On that rock, I know, the Church is built."

Pope Leo I claimed "Peter's privilege" for the see which he occupied. Nor does any historian doubt that, by the middle of the 4th century, all the essential features of the papal supremacy, both in ruling and teaching the universal Church, were manifest.

That which is now termed private judgement or free thought bore during the first period of Christendom the name of heresy. Orthodox Catholics would not suffer it, relying on S. Paul, who pronounced even an angel to be anathema, did he preach "another Gospel" (*Galatians i, 8*); on S. John's command not to receive such a one (*2 John 10*); on the saying of Christ, "If he will not hear the Church, let him be to thee as a heathen and a publican" (*Matt. xviii, 17*). Hence the bishops, "the succession from the Apostles," defended the true revelation against its impugnors by insisting on tradition which they expounded according to "the rule of ecclesiastical and Catholic sense."

Heretics were cut off, excommunicated if they obstinately held to their doctrines; and those who set up bishops of their own in

opposition to the recognized hierarchy, as the Donatists in Africa, were held guilty of schism, or sect-making.

The Church thus guided, in union with Rome, continued ever the same, *Semper eadem*, in belief and observance, while Gnostics, Manichaeans, Arians, Nestorians, Monophysites rose, passed over the scene, and disappeared. But the sacrament of unity enabled the central Christian society to triumph over the sects, to survive the fall of the Western Empire, to convert the barbarians, and to save civilization. Papal Rome victoriously withstood the Moslem onset; by its Catholic enthusiasm Spain, after centuries of combat, won back freedom from the Moors, and planted religion in the vast American territories from Mexico to Paraguay.

We read in Gibbon's great work that the bishops made France, as bees make their hive. The crusades, inspired by popes, kept Saracens and Turks out of Europe, until the Greeks, quarrelling with Rome, lost Constantinople and enslaved themselves. In 1517, Luther opened the era of the Reformation, which led, wherever Rome's authority was denied, to national Churches, and then to sects beyond reckoning.

On the other hand, research has discovered more and more the profound identity subsisting between the papal organism now extant, and its earliest forms. Its developments in doctrine, life, and worship are seen to follow the inevitable lines upon which it started. Catholic Rome, said Newman, who was deeply read in Patristic literature, is "ancient Antioch, Alexandria, Constantinople," brought down to the latter days. Tyrrell has called it "a religion of the whole man, body, soul, and spirit," adapted to every level, but above them all.

Continuity of Doctrine

In other words, say her representatives, Rome has kept the deposit committed to S. Peter and his fellow Apostles, and the Catholic Church is, thus, in substance the religion which Christ taught. Rome is the dogmatic principle incarnate, holding to Bible, Sacraments, the Mass, the Hierarchy, and S. Peter's Keys, without change throughout the ages.

As computed, there may be three hundred millions all told who look up to the bishop of Rome as their spiritual father. In every nation some are to be found. Of Churches calling themselves Christian, undoubtedly by far the largest is the Roman. Her votaries cover the whole of what was once the Western

Empire, save that in Britain they are few; but Ireland, like Poland, must be added, with small uniate bodies in the Near East. Under the Stars and Stripes more than 23,000,000 dwell; Lower Canada is French Catholic; and nearly the whole of Central and South America belongs to the same communion. In the British Empire twelve millions are reckoned altogether. Catholic missions flourish in Africa, especially in Portuguese, French, and British territories. They have long been at home in India, China, and Polynesia.

This multitude of nations and peoples come under the jurisdiction of some 1,600 bishops, archbishops, and patriarchs, appointed by the pope; and is directed by a numerous clergy, the secular or diocesan, subject to local bishops, and others belonging to religious orders bound by special vows. Both diocesan and religious take upon them the lifelong obligation of celibacy. The orders of monks, friars, and various other denominations were founded by S. Benedict, S. Francis, S. Dominic, or follow the rule of S. Augustine, or are Jesuits from S. Ignatius of Loyola, to whose general method of life many more, springing up since 1600, have conformed.

Church Discipline

Orders of women, cloistered and contemplative, teaching and nursing, have grown rapidly, and are on the increase. Discipline is severe throughout the Church, and is often thought by strangers to be the secret of its power. But Catholics declare the secret to be a universal and utter belief in the supernatural treasures of which clergy and hierarchy hold the guardianship. The gift which the Church offers to the faithful is Christ Himself, not merely instruction or example, but the Holy Eucharist, absolution from sin, intercession at the altar, assistance by prayer and good works during life and after death.

All the elaborate machinery of government is only a means towards holy living and dying, of which the path and goal are set out in books, such as *The Imitation of Christ*, *The Spiritual Exercises*, and countless others which might be quoted as illustrations of a striking fact, viz. that the most detailed Canon Law and unwearied episcopal vigilance lead us into a region where the spirit is all in all. Saints and their wonderful works are the ever-present aim of Catholic teaching; there is no age but yields a harvest; and the pope who canonises them calls himself "servant of the servants of God."

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Romance (Old Fr. *romanz*, from late Lat. *romanicæ*, in the vulgar tongue). Primarily signifying a work in one of the Romance dialects derived from the Latin language, especially early French and Provençal, the word romance soon came to denote specifically the chronicle of adventure, narrated in verse or prose, to which this vernacular literature was mainly devoted. Of fiction of this kind, epic in its essence, the *Odyssey* of Homer was the prototype, and its natural development was the picaresque romance exemplified in the literatures of Spain, France, and England by Don Quixote, Gil Blas, and Tom Jones. Occupying a place between the medieval legendary romance, concerned chiefly with action, and the modern novel, concerned chiefly with the dramatic presentation of ideas, romance, in the general acceptance of the term, makes use of properties of both the one and the other; and, in addition, has qualities peculiar to itself that not only invest its literary expression with glamour so distinctive as to constitute a separate art form, but create an atmosphere in which the facts of common life appear glorified.

The evolution of romance as an art-form can be studied in this *Encyclopedia* in the articles on the literature of the various countries in which it was brought to high perfection, and in those on the great writers who were its best exponents. Here, the essential nature of romance is alone under consideration. The secret of its being is to be found in the source of that glamour which is its distinguishing attribute, and which makes its appeal irresistible to young and old alike in all ages and in all countries "In a sense there is neither youth nor age in romance," said William Sharp—himself, in his other personality of Fiona Macleod, a master of the art of pure romance—"it is the quintessence of the most vivid emotions of life," and a man need

only took within himself to perceive that those emotions are concerned with his love and with his faith.

The difference between the early epic or chronicle of action and the true romance was that the former gratified only the admiration for heroic deeds which is proper to youth and the early prime of life, whether of a man or of a people, whereas the latter satisfies the permanent emotion of the human heart by giving a moral purpose to the quest for an ideal, in the course of which the adventures befall the fictitious hero.

Under the old mythology man was the sport of the gods. In the light of Christianity he appears as master of his fate, able to work out his salvation by faithful devotion to an ideal. Under the old dispensation the hero's object was, at its lowest, self-preservation, and, at its highest, self-aggrandisement. Under the new dispensation his purpose is, at its lowest, self-interest, and, at its highest, self-sacrifice. Not until Christianity had quickened chivalry into life was the ground ready for romance. *See* Novel; Romanticism; Romantic Movement; consult also *The Flourishing of Romance and the Rise of Allegory*, G. E. B. Saintsbury, 1897; *Epic and Romance*, W. P. Ker, 2nd ed. 1908.

Romance Languages. Name given to a group of languages, including a number of dialects, spoken in most of those countries of S. and W. Europe which once belonged to the Roman empire. These languages are: Italian, Spanish, Portuguese, Provençal (with Catalan), Rhaeto-Romanic (spoken in the Grisons and Tirol), Rumanian, and French. They are all descended from Latin, not the literary, but the popular language—vulgar Latin or *lingua Romana*.

The Romance languages, as contrasted with their parent, are strikingly analytic. There are hardly any traces of noun-inflexion, which is abandoned in favour of prepositions; auxiliaries are much used in representing verbal inflexions; a definite and an indefinite article have been added. On the other hand, the Romance languages exhibit greater wealth of new formations, such as augmentatives and diminutives. The vocabulary is in the main Latin, consisting partly of words handed down from generation to generation, partly of words of more recent origin, derived from literary, ecclesiastical, and legal sources. Several other languages have also contributed. There are numerous Celtic elements in French. German

has supplied many terms, especially in connexion with military and judicial matters, hunting, navigation, and articles of dress. Spanish and Portuguese show considerable traces of Arabic influence. But the most mixed is Rumanian, into which Slavonic, Turkish, Greek, and Illyric-Albanian elements have made their way. Italian has remained most faithful to the parent language, while French exhibits the greatest divergences. *See* France; Latin Language; Provence; Spain, etc.

Roman de la Rose (Fr., romance of the rose). Allegoric, descriptive, and philosophic old French poem. The first part, about one-fifth, was written c. 1225 by Guillaume de Lorris, and the rest was added about 1270 by Jean de Meung or Clopinel. Two hundred MS. copies have survived. Lorris wrote of the lover, or love personified, in search of the rose typifying beauty. The continuator ranges over all fields of knowledge and speculation, and in doing so throws much light on the life and thought of the 13th century. The Romance of the Rose had great influence in Italy and England, as well as in France. Chaucer translated nearly one-third of its 22,000 lines. In the 16th century Marot rewrote the whole poem in the French of his day; and in 1878–80 a fresh translation into modern French was published. *See* English version by F. S. Ellis, 1900.

Romanes, GEORGE JOHN (1848–94). British scientist. Born at Kingston, Canada, where his father



George J. Romanes,
British scientist

was a professor, May 20, 1848, he was taken at an early age to England, where he completed his education at Caius College, Cambridge. Deciding to make scientific research his life-work, he made many biological observations in a laboratory of his own, at Dunskaith, in Scotland. The results of his work appeared in various papers and lectures, and won for him the F.R.S.

In early days Romanes had thoughts of becoming a clergyman, but for a time he took up an unorthodox attitude, and his *Candid Examination of Theism*, 1878, was antagonistic to accepted beliefs. Later on, he returned to something of his old faith, and revealed this in *The Fallacy of Materialism* and some other writings, e.g. *Thoughts of Religion*, published in

1895. He died in Oxford, May 23, 1894. His works include *Animal Intelligence*, 1881; *Mental Evolution in Animals*, 1883; *Darwin and after Darwin*, 1892–97; and *Essays*, 1897. *See* his *Life and Letters*, by his wife, 1896. *Pron.* Ro-mah-nez.

Romanes Lecture. Annual lecture delivered at Oxford. It was founded by George John Romanes in 1891, the terms being that a man of eminence shall be elected annually to deliver a lecture on a scientific or literary topic. Gladstone delivered the first, on *Medieval Universities*, Oct. 24, 1892; and later lecturers have included T. H. Huxley, W. Holman Hunt, T. Roosevelt, Viscount Morley, and H. H. Asquith.

Romanesque Architecture. In general, the style of building prevalent in Europe from the 4th century to the 12th. Based on Roman architecture, it expressed and developed the principle of the round arch and the vault, but locally it differed widely from its exemplar in plan and constructive aim. Thus the Romanesque period witnessed the development of the cruciform church, henceforward the standard type of medieval church, from the old basilica. With the exception, too, of certain structures in Germany and N. Italy, where the Teutonic builders clung to the old Roman weight and massiveness of masonry up to the 12th century, Romanesque construction was comparatively light.

Broadly speaking, the style followed two separate lines of development, those of the East and the West. That of the East, radiating from Constantinople, was known as the Byzantine, and had for its special mission the perfection of the dome. That of the West was profoundly modified by Byzantinism, especially in Venice, Ravenna, and along the Adriatic shore, and shared with it certain distinctive features, such as the springing of the arch direct from the cushion capital. The progress of Romanesque towards Gothic was more rapid in France than elsewhere; there builders were the earliest to attack the structural problems, were the great experimenters in the lightening of construction, and invented the flying buttress and, ultimately, the pointed arch.

Among the principal features of a decorative character in Romanesque building was the arcade. In the Rhenish towns and throughout N. Italy, arcades are present in vast numbers, sometimes about the size of churches or cloisters, elsewhere as mere ornament on a blank

wall. Every variety of colonnette was used, with or without constructional value; capitals and string courses were richly carved, the carving being more naturalistic in the N. than in the S., where the classic forms still prevailed. Domed roofs were covered with mosaics, pavements, richly inlaid, especially in buildings erected under Byzantine influence. In England, Romanesque appeared in the 11th century in the form of Norman architecture (*q.v.*). It flourished also with local peculiarities in Provence, where, in the 11th and 12th centuries, it is spoken of as the Roman style. See Apse; Arcade; Architecture; Basilica; Byzantine Architecture; Capital; Mosaic; Rome; Art; consult also Byzantine and Romanesque Architecture, T. G. Jackson, 1913.

Romani. Town of Egypt, in the N. of the Sinai peninsula. It is 20 m. E. of the Suez Canal, on the rly. from El Kantara along the Mediterranean coast. It gives its name to the battle fought there in 1916.

Romani, BATTLE OF. Fought in Aug., 1916, between the British and the Turks, and sometimes called the second battle of Katia. After the retirement of the Turks from Katia (*q.v.*) in April, 1916, Sir Archibald Murray pushed on with the building of the rly. from El Kantara, on the Suez Canal, to Romani, where he constructed permanent defensive works. During July the Turks concentrated 20,000 men at el Arish under Kress von Kressenstein, who advanced to Bir el Abd on July 19, and disposed his troops so as to envelop Katia, which was patrolled by the British. The British then withdrew to Romani.

Next day the Turks occupied Oghratina, and entrenched. On the night of July 27-28 Kressenstein swung his whole line forward, chiefly on his left, his right being held up by Anzac Mounted Rifles. After a strong reconnaissance on Aug. 2 he attacked, at midnight on Aug. 3, the British positions from Romani to Mahemdia on the sea, and at the same time attempted from the S. to cut in rear the British communications by an advance across the high sand dunes.

At the outset the Turks carried the dunes, and got within a mile and a half of the rly. at Pelusium, but the Australians and New Zealanders were reinforced, the dunes being recaptured, and the enemy was thrown back. Kressenstein was beaten, but fighting continued during Aug. 5-7, the British steadily driving on the Turks, who evacuated Oghratina on Aug. 8, and did not stop their retreat till they

reached el Arish three days later. The Turkish losses were estimated at 10,000, of whom 5,000 were prisoners. See Palestine: the British Conquest.

Romania. Name given sometimes to the Latin kingdom of Constantinople, which was founded by the Crusaders in 1204, and lasted until 1261. In 1203 the members of the fourth crusade reached Constantinople, and restored Isaac Angelus and his son, Alexius IV, to the throne of Byzantium. Certain troubles then arose between the allies, the result being that the Crusaders assaulted, captured, and plundered the city. Then the new empire was founded, its first ruler being Baldwin, count of Flanders. It was organized on feudal principles, but the emperor's authority was practically confined to the neighbourhood of Constantinople and some islands in the Aegean.

Baldwin was taken prisoner in Greece, and his successors could do nothing to maintain, much less to extend, their authority. Their vassals were occupied with their own affairs, and the Byzantine emperors, who had retired to Asia Minor, won back their lost territory piecemeal until in 1261 Michael Palaeologus retook Constantinople. The Latin empire thus came to an end, although the last emperor, Baldwin II, was occupied until his death in 1273 in planning for its recovery. See Byzantine Empire; Crusades.

Roman Law. System of civil law evolved in the Roman state from the time of the kings until its codification by Justinian. Its importance lies in the fact that it is still the basis of a large part of European jurisprudence, as well as of the systems in other parts of the world, such as S. America and S. Africa, which were built up originally on the same basis. Further, it lays down many principles which are common to the English law, and under the latter system are actually expressed in the original Latin, *e.g.* *Volenti non fit injuria*, a person cannot be injured by what he willingly consents to; *ignorantia juris neminem excusat*, ignorance of the law excuses no one; *res ipsa loquitur*, the thing speaks for itself. Moreover, it is unique in history as a steady developing system of law whose course can be traced for some thirteen hundred years, and which early freed itself from the somewhat superstitious and religious rites and rules.

Taking the Twelve Tables (450 B.C.) as the starting point, the sources of Roman law may be summarised as follows: (1) Imperial

decisions, whether made in the form of commands to officers (*Mandata*), replies to appeals from public bodies (*Epistolae*), or from magistrates (*Rescripta*), or of judgements (*Decreta*), or of general laws (*Edicta*). (2) Equity of the Praetors and Curule Aediles. (3) Opinions of the juriconsults (*Responsa prudentium*), of whom the greatest were Paulus, Ulpian, Papinian, Gaius, and Modestinus. The best part of Roman law may be ascribed to the juriconsults, though the Praetors also built up a sort of case-law, very useful and effective till codified by the *Edictum Perpetuum* of Salvius Julianus in the reign of Hadrian (A.D. 117-138). In A.D. 533-34 came the Institutes and Pandects of Justinian.

In early Roman society slavery was the general state of the masses, but slaves could be, and often were, freed in various formal ways, such as *manumissio*. In all classes the *patria potestas* was the rule; the father, speaking generally, had absolute power over his wife and children, and was legal owner of all property in their possession. But, by a fictitious process of pawning his son, *mancipatio*, a father could free him from the parental power. A man could not sell any real property which formed part of his wife's dowry.

Owing to the strict laws of succession, depending upon the ancient idea of ancestral piety, it was essential in early Roman law to have an heir who was bound to undertake all the funeral rites and pay the deceased's debts, even if the latter left no estate. So if there were no son one was adopted to carry on the succession. Finally, in Justinian's time, something like the modern methods of distribution of a dead person's assets was adopted, and due regard was paid to the claims of the blood. Even then the dominant idea of a will or *testamentum* was the naming of an heir, but this was superseded eventually by *codicilli* and *fideicommissa*, whereby the testator's wishes for the disposal of his property could be executed with less formality. Children of a deceased person were entitled to one-fourth of his property, and he could not will it away. If there were four children or less, their share was $\frac{1}{4}$, if five children or more, $\frac{1}{5}$. A poor widow was allowed $\frac{1}{4}$ if without a dowry, and if she had three children she took a *virilis pars*. This bar against complete disinheritance still holds in legal systems based on the Roman law. See Jurisprudence; Justinian; Law; Scots Law; Slavery; Twelve Tables; Will.

William Latcy

Romano, Giulio (c. 1492–1546). Italian painter, whose real name was Giulio Pippi dei Giannuzzi.



Giulio Romano,
Italian painter
Self-portrait

Born in Rome, he studied under Raphael, who employed him at the Vatican. After Raphael's death, the completion of his frescoes in the Hall of Constantine in the Vatican was entrusted to Giulio and G. Penni. In 1524 Giulio entered the service of Federigo Gonzaga at Mantua, where he acted as architect and decorator of the Palazzo del Te. He died at Mantua, Nov. 1, 1546. See Ceiling; Cyclopes.

Romanoff. Name of the family which occupied the throne of Russia, 1613–1917. It derives its name from Roman, a member of an old noble house, whose daughter, Anastasia, married the tsar Ivan the Terrible, while his son, Nikita, married the princess Eudoxia, a descendant of Rurik, the founder of the Russian monarchy. Nikita's son, Feodor, became the patriarch Philaret of Moscow, and his son, Michael Romanoff, was elected tsar in 1613. He was succeeded by his son Alexis, and then by his grandsons, one of whom was Peter the Great. The male line ended with Peter II in 1730, when Anna, daughter of Ivan II, ascended the throne.

On the extinction of her line, which happened on the death of the empress Elizabeth in 1762, the crown passed to the Holstein-Gottorp or Oldenburg branch. This was descended from Anna, daughter of Peter the Great, and her husband, Charles Frederick, duke of Holstein-Gottorp. Its first sovereign was Peter III, and the family occupied the throne until the abdication of the tsar Nicholas II, Mar. 15, 1917. See Moscow; Russia.

Romanones, FIGUEROA Y DE TORRES MENDIETA Y DE ROMO, DON ALVARO, COUNT OF. Spanish statesman. He entered the Cortes as Liberal deputy for Guadalupe and first held office in 1905, when he was minister for public works, agriculture, and commerce. In Nov., 1912, he became Liberal prime minister on the death of Señor



Count of Romanones.
Spanish statesman

Canalejas. Next month the collective resignation of the Cabinet was announced, but Romanones remained in power at the head of a new cabinet until May, 1913, when he resigned, but was induced by King Alphonso XIII to remain. In October, 1913, the ministry resigned. Romanones took office as prime minister again in Dec. 1915, with a policy of maintaining strict Spanish neutrality. Personally, he was strongly convinced of the justice of the allied cause, and for this was violently attacked, but in spite of many difficulties he remained in office until May 1, 1917. Foreign minister, Nov., 1918, he was prime minister, Nov., 1918–April, 1919.

Roman Road. Highway constructed by the Romans. The Romans were great builders of roads and those they made possess remarkable powers of endurance. In England many roads radiated from London. The chief were Watling Street and Ermine Street; while three others were Akeman Street, Icknield Way, and the Fosse. See Britain; Road; Watling Street, etc.; consult also Roman Roads in Early Britain, T. Codrington, 1905.

Romans. Town of France, in the dept. of Drôme. It stands on the right bank of the Isère, 49 m. W. of Grenoble. A bridge connects it with Bourg-de-Péage opposite. It has manufactures of leather, shoes, gloves, baskets, hats, etc., and there is a considerable trade in cloth, liqueurs, and cattle. The mulberry is cultivated, and in the vicinity is the famous vineyard of l'Ermitage. The town grew up round an abbey founded by S. Bernard of Vienne, in 837. Pop. 17,000.

Romans, EPISTLE TO THE. One of the four principal Epistles of the Apostle S. Paul. The epistle would seem to have been written from Corinth towards the end of the Apostle's third missionary journey, and to have been intended to prepare the way for a visit to the Roman Christians, which he was hoping soon to make. Its purpose is to explain the universal character of the Gospel, and the leading ideas of Christian doctrine, and to give practical advice.

S. Paul declares that Jew and Gentile alike are assured the righteousness of God by faith (justification by faith). What then becomes of the law? The answer is that, since Abraham himself was justified by faith apart from the law, justification by faith implies freedom and redemption from the law. The Apostle himself was set free by Christ from the law of sin

and death (Rom. vii, 13–25; cf. 1 Cor. xv, 22). If God rejected the Jews in order to save the Gentiles, the responsibility was their own; and it was still possible for them to be restored to favour (Rom. 9–11). In the practical exhortation the Romans are urged to love the brethren, to submit to the powers that be, to avoid judging one another harshly, and to bear the infirmities of the weak (Rom. 12–15).

The epistle was written about A.D. 58 to a community which included both Jews and Gentiles. Its genuineness is fully attested. It is included in the Canon of Marcion and in the Muratorian Canon. It was used freely by the author of 1 Peter, and by Clement of Rome, Ignatius, and Polycarp. It has much in common with other epistles written by S. Paul. It should be added that there is manuscript authority for the omission of the words "in Rome" in i, 7, 15; and in some manuscripts the doxology of xvi, 25–27 (A.V.) is found at the end of 14, or in both places, or is not found at all. It is possible, therefore, that there were in circulation abbreviated copies of the epistle. See Bible; Paul; consult also Romans, W. Sanday and A. C. Headlam, International Critical Commentary, 3rd ed. 1898.

Romanticism. Movement in art. Embodying a revolt against the classic tradition in art, it began about the middle of the 18th century, and permeated all Western Europe. It constituted an appeal to the emotions instead of to the intellect, and reached its climax of intensity in the first part of the 19th century, affecting the modes of the day, when materialism in the industrial world had become all-powerful. Its principal manifestations were the school of figure painters headed by Géricault and Delacroix, and that of the Barbizon painters of landscape, while the same ideal was taken up by the English Pre-Raphaelites. There were counterparts of art romanticism in Germany, particularly at Düsseldorf under Schadow's leadership, and also in the Antwerp school of historical painters.

Romantic Movement. Name given to a phase through which imaginative fiction in prose and verse passed in the period approximately covered by the last third of the 18th and the first third of the 19th century. A reflection in literature of the universal effort at emancipation from tyranny that culminated in the French Revolution, with its later repercussion throughout Europe, it was largely

a rebellion against the inflexible rigidity and limited imaginative range of the classical school.

In Britain the movement is dated as beginning with Percy's *Reliques of Ancient Poetry*, 1765, and the literary forgeries of Macpherson and Chatterton. The native wealth of romantic material thus discovered gave literary genius a new interest in medievalism. In *The Castle of Otranto*, 1764, Horace Walpole deliberately made the experiment of blending ancient romance with the modern, grafting the supernatural element of the former on to the realistic truth to life of the latter. His book, with all its faults, obvious even at that time, fixes his place as the inaugurator of the romantic movement that in England passed through Anne Radcliffe, Matthew Gregory Lewis, C. R. Maturin, and others, to find its full perfection in the romances of Scott and the poetry of Byron, Shelley, and Keats.

In Germany the romantic movement may be traced through Goethe (in his first phase), Schiller, Bürger, and the Schlegels; in France through Rousseau, Chateaubriand, the elder Dumas, Victor Hugo, whose *Hernani*, 1830, marks a climax, Béranger, and de Musset; in Italy, where it never established itself securely, in Manzoni and Leopardi. See Goethe; Romance; Rousseau, etc.

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Romantic Music. Term applied to that class of composition which early in the 19th century began to supersede the so-called classical school, as a result of a desire to make music expressive of emotion and imagination rather than merely correct on formal lines. Even in classical times, however, the spirit of romanticism was often present. The later works of Beethoven led up to composers like Schubert, Chopin, Schumann, Mendelssohn, Liszt, and Wagner.

Roman Wall. Term denoting, in Britain, a Romano-British mural defence. Roman walls were associated with military frontiers, forts, and towns. Of the first type are Antonine's Wall and Hadrian's Wall. Characteristic examples of the second are Aesica, Castlecary, Cilurnum, and Ribchester. Of the third, besides Silchester and Viro-

conium, there are good remains at Caerwent, Monmouthshire, the ancient Venta Silurum; the most perfectly preserved are at Chester, the ancient Deva. Considerable fragments remain in London Wall, Cripplegate, Tower Hill, and elsewhere in London. The fort and town walls often included a parapeted roadway for observation and defence, sometimes with bastions and salient towers. The structural details—gates, guard-chambers, outer fosse, quadrangular plan with rounded corners—were developed from the temporary earthwork camps laid out by Agricola and his successors. See Britain; Northumberland; consult also *Handbook to the Roman Wall*, J. C. Bruce, 8th ed. 1921.

ROME: THE CITY AND ITS HISTORY

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This article deals with the city of Rome, the empire which developed therefrom being the subject of the succeeding article, while a further contribution deals with Roman art. See also the entries Capitol; Forum; Palatine; Vatican; Viminal, and others associated with the city; also Ostia; Romulus, etc.

A city of Italy, and capital of the kingdom, and seat of the papacy, Rome stands on the Tiber, mainly on the left bank, 17 m. from its mouth. Pop. (1911) 538,634

The traditional date of the foundation of Rome is 753 B.C., and recent discoveries have shown that this date is approximately correct. The nucleus of the city was the Palatine hill, no doubt selected by the first settlers, whoever they were, owing to its natural advantages of strength and position. There were other settlements on the surrounding hills, which were of less importance, and these were fused into one about the middle of the 6th century B.C., when the Cloaca Maxima was constructed, and the adoption of the Forum as a market place made possible.

To this period belong the earliest city walls, attributed to Servius Tullius, which were reconstructed after the capture of Rome by the Gauls in 390 B.C.; they enclosed the seven hills of Rome—Palatine, Capitol, Aventine, Caelian, Esquiline, Viminal, and Quirinal. They consisted of a massive embankment wall, built on the edge of the cliffs (which were far more prominent in ancient times than now, when it is often difficult to recognize them), or protected by a ditch where it was necessary to cross level ground.

Romany Rye, THE (The Gypsy Gentleman). Autobiographical romance by George Borrow, first published in two volumes in 1857. A sequel to *Lavengro* (q.v.), and written at Oulton Broad, it recalls some of the author's early experiences of gypsy life in England, and is one of the most popular of his works. The title is taken from a song sung by Mr. Pentulengro in chap. 54 of *Lavengro*.

Rome, Prov. of Italy. Lying between Tuscany and Campania, its area is 4,664 sq. m. Backed by the Apennines, it is largely mountainous. The Tiber flows through it, and it contains Bolsena, Albano, and other lakes. Although it includes the city of Rome, it is mainly an agricultural area.



Rome. Arms of the city

An outpost on the right bank, on the summit of the Janiculum, protected the crossing of the river by the Pons Sublicus, the earliest of Roman bridges, built entirely of wood. The area which these walls enclosed was larger than was actually occupied by buildings, and the growth of the city was naturally at first most rapid in the low ground, where water could be obtained from wells, and where the Tiber, an important waterway, even in early times, was most easily accessible. Its main lines were dictated by the natural features and by the position of the city gates, from which issued the famous roads which, at first leading only to the villages in the neighbourhood, were gradually extended until they ramified all over the Roman Empire.

The first military highway, the Via Appia, was constructed in 312 B.C., and the first aqueduct dates from the same period. Others followed as occasion demanded, and the provision of a good water supply—and no city in the world had or has a better—rendered it possible for Rome to extend over the hills. It grew up, however, quite unsystematically; the area by the river was cramped, although it had already overflowed into the Campus Martius, the low ground on the north by the river, which was originally the drill ground and had been left outside the walls of the city.

Julius Caesar was the first to attack the problem, in this as in other cases. He remodelled the



Map of the Roman Empire at its greatest extent, during the reign of Trajan, A.D. 98-117

Forum Romanum—what we now see there is in the main his in conception—and built the first of a series of fora in the space between the Capitol and Quirinal, with a view to the improvement of communications between the N. and S. parts of the city. It was in his time, too, that the river was first embanked, and that Pompey erected the first important group of public buildings in the Campus Martius.

Augustus completed what Julius had begun, and besides displayed much activity in other directions; so that his famous boast that he found Rome of brick and left it of marble is amply justified. He erected three groups of public buildings in the Campus Martius, restored no fewer than 82 temples and built others, including that of Apollo on the Palatine, divided the city into 14 regions, eight of them within the Servian wall and five outside it, the fourteenth being formed by the island and a considerable commercial quarter on the right bank of the river. A police and fire brigade was also established, the river was once more regulated, and the first public baths were constructed.

Imperial Palaces

The next emperors were mainly occupied with providing themselves with magnificent palaces. Augustus had been content with the house of Cicero's opponent Hortensius, which, generally known as the house of Livia, may still be seen on the Palatine. This was the aristocratic quarter, and recent excavations there have brought to light remains of other houses of the same period with fine paintings. The successors of Augustus constructed a splendid palace on this hill, while Nero occupied the whole district between the Palatine and Esquiline with his enormous Golden House, which spread over a larger area than the Vatican. Whether he was responsible for the fire which is always associated with his name will never be known; but he certainly took advantage of it, not only in this respect, but by compelling private proprietors to reconstruct their houses more substantially and to encroach less on the streets.

Vespasian marked the accession of a new dynasty by the restoration to public uses of much of what Nero had appropriated, and built the first permanent amphitheatre, the Colosseum, where Nero had formed an ornamental lake; he also added a new forum, that of Peace, rebuilt the temple of Jupiter on the Capitol, and carried out a new survey of the city. To his second son, Domitian, is mainly due the construction of a still more

magnificent imperial residence on the Palatine. Of that which had preceded it, we may gain some idea from the remains which he left under the floors of his palace, for Roman builders did not destroy the remains of previous edifices, but left them to serve as foundations. It was approached by a series of magnificent halls, one of which has been generally, but wrongly, identified with the temple erected in honour of Augustus after his death, while the church of S. Maria Antiqua was ensconced in another in the 6th century.

Hence an inclined plain led up to the Palatine, where the palace of Tiberius on the N.W. summit of the hill was rebuilt, while the S.E. part was taken up by another huge palace, divided into state apartments, a residential portion, and a garden. Domitian began the construction of a new forum, which was finished by Nerva; but the series of imperial fora was completed by Trajan, who finally cut back the cliff of the Quirinal to a maximum height of 100 ft., as the inscription on his column records, and thereby was enabled to overcome finally the difficulty of communications through this narrow space—which is one of the most pressing traffic problems of the present day. He also brought another aqueduct to Rome, and erected enormous public baths on the site of the Golden House. These were until 1895 known as the baths of Titus, which were in reality close to the Colosseum, and very much smaller.

The Golden Age

Hadrian, his successor, was also active in building, and besides the immense villa which he erected for himself near Tivoli, he is responsible for the temple of Venus and Rome, for the Pantheon in its present form, one of the best preserved ancient buildings, and certainly the most beautiful interior which we have, and for his mausoleum, which later became the Castle of S. Angelo, the great fortress of the popes, and the bridge leading to it. Marcus Aurelius imitated Trajan in erecting a column on which his campaigns were represented in bas-relief; but Septimius Severus was the next great builder, the fire in the reign of Commodus having given him his opportunity.

The temple of Vesta, the house of the Vestals, and other buildings were restored by him; he made a considerable addition to the imperial palace on the Palatine, and was responsible for a marble plan of ancient Rome, considerable fragments of which exist. His son

Caracalla built huge thermae on the Via Appia, but the rest of the emperors of the 3rd century A.D. had no leisure for building, with the exception of the hasty construction of the city walls by Aurelian and Probus, who took advantage as far as possible of existing buildings. They are built of concrete faced with brick and are still in great measure preserved.

In 283 another fire gave Diocletian the opportunity of further extensive restorations; he was also responsible for the colossal baths which bear his name, and which are now the seat of one of the finest of Roman museums. Maxentius erected the greater part of the huge basilica in the Forum which his conqueror, Constantine, completed—a building which can no longer claim to be the earliest basilica in Rome, now that one of the 1st century A.D., undoubtedly pagan, decorated with very fine stuccoes, has been found underground near the Porta Maggiore.

Christian Basilicas

Constantine was also responsible for the erection of the earliest and most important of the Christian basilicas: S. Pietro, S. Paolo, S. Lorenzo, etc., many of which stood on the actual site of the tombs of the martyrs; this fact led to the preservation of the roads which led to them throughout the Middle Ages, and is thus of topographical importance. After the triumph of Christianity the catacombs, which had been excavated along the main highroads, became the goal of pilgrims, and some of the basilicas of Constantine were built over the tombs of the saints.

After the barbarian invasions, in which the aqueducts were destroyed, the upper portions of the city, which depended on them for their water supply, were abandoned, and medieval Rome, with the exception of a number of isolated churches, convents, and strongholds, was crowded into the low ground near the river. Many of the last were built into the remains of ancient edifices, which had been partially ruined by earthquakes; one of the worst of these occurred in the middle of the 9th century. It is to these, and not to the damage wrought by the barbarian invaders, that the destruction of the ancient monuments must be attributed.

Of medieval Rome, as a fact, very little remains except towers and campanili. Most of the churches, as well as the great papal palaces of the Vatican and the Lateran, have been transformed entirely by the architects of the Renaissance and of its successor

the baroque period. And the popes, no less than the emperors, sacrificed the work of both their pagan and Christian predecessors to their own, which was in most cases of great merit, though less can be said in favour of the decay in taste of the 18th and the neo-classicism of the 19th centuries.

From the 15th century onwards we have a series of plans, bird's-eye views, and views of the city which surpasses in completeness anything else of the kind. From these we learn that it was in the pontificate of Sixtus V (1585-90) that Rome took on the outward appearance which it had until after 1870. By the construction of an aqueduct which supplied the hills, he rendered them once more fit for habitation, and the transformations which he wrought in the

streets are noteworthy. The re-erection of many ancient obelisks did much to give them a striking termination. After 1870, the growth of the modern city led not only to the occupation of almost all the areas within the city walls by buildings, but to the construction of numerous suburbs, which are now regulated in accordance with a plan drawn up by the municipality.

The fundamental error, however, which was made in the first few years of Rome's life as the capital of Italy, can never be wholly corrected; and, indeed, its consequences must always be felt. Owing to the fact that the new quarters were allowed to spring up on all sides of the old city, it has been necessary, and will always be so, to cut new thoroughfares through the centre of it, and the compromise between

the demands of modern traffic and the claims to preservation of buildings of artistic and historical importance will never be found.

The most prominent buildings of the modern city are the huge monument to Victor Emmanuel II, on the north side of the Capitol, the law courts, on the right bank of the Tiber, the new Chamber of Deputies, the Banca d'Italia, and the principal civil hospital, the Policlinico. None of them is quite worthy of its surroundings. The embankment of the river caused the removal of much that was picturesque.

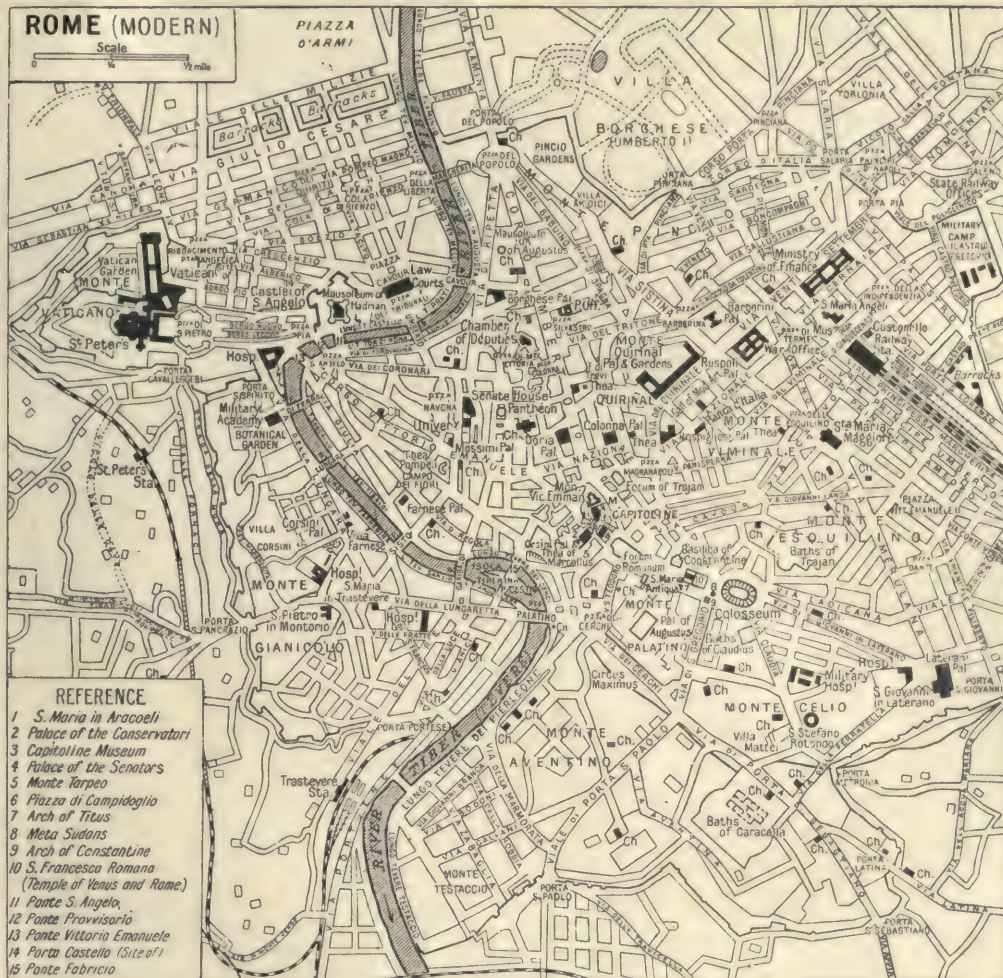
All these transformations have led to the discovery of many hitherto unknown monuments of ancient Rome, and in many cases to their inevitable destruction. Much has, however, been done in



English names of places indicated by numbers. 1. Baths of Alex. Severus. 2. Temple of Jupiter (Capitol). 3. Tem. of Mater Matuta (Cattle mkt.). 4. Tem. of Ceres. 5. Arch. of Constantine. 6. Arch. of Janus with four faces. 7. Tem. of Minerva. 8. Colon. of Octavia. 9. Basilica of Trajan. 10. Forum of Trajan. 11. For. of Augustus. 12. For. of Nerva. 13. Stadium of Domitian. 14. Tem. of Isis and Serapis. 15. For. of Vespasian. 16. Col. of Marcus Aurelius. 17. Crematorium. 18. Swine Mkt. 19. Camp of Praetorian Guards. 20. Circus of Caligula. 21. Training Stables. 22. Sundial. 23. Concert hall of Domitian. 24. Voting enclosures of Julius Caesar. 25. Public Villa. 26. Provision Mkt. of Livia. 27. Cattle Mkt. 28. Golden House of Nero. 29. Court of Law. 30. Great Circus.

31. Tem. of Queen Juno. 32. Grove of Furrina. 33. Tem. of Jupiter and Liberty. 34. Granaries of Galba. 35. Roman Forum. 36. Arch. of Titus. 37. Tem. of Vespasian. 38. Arch. of Septimius Severus. 39. For. of Peace (of Vespasian). 40. Col. of Diocletian (Phocas). 41. Orators' platforms. 42. Black Stone. 43. Arch. of Augustus. 44. Spring of Iuturna. 45. Tem. of Vesta. 46. Mamertine dungeon. 47. Senate House. 48. Voting place. 49. Record office. 50. Pool of Curtius. 51. Altar of Julius Caesar. 52. Palace of Numa. 53. House of the Vestals. 54. Granaries. 55. Stadium Domitiani. 56. Iseum at Serapeion. 57. For. Vespasiani. 58. Col. Marc. Aurelii.

Latin terms and their equivalents in English: *Aqua*, aqueduct; *collis*, hill; *horti*, gardens; *mons*, hill; *pons*, bridge; *porta*, gate; *thermae*, baths; *vicius*, street.



Rome. Plan of the capital city of Italy, showing the principal churches and public buildings

the way of laying bare the remains of the Forum and Palatine, and many other buildings, in order that they may remain permanently visible. The region extending on both sides of the Via Appia and bounded by the city walls has been made into a public park, under the name of the *Passeggiata Archeologica* (archaeological park); but unluckily no excavations were made on the site before the park was laid out. We may also note the construction of a tunnel under the Quirinal hill, 1902. The municipal government of the city of Rome is in the hands of the *sindaco* or mayor, a town council of 80 members, out of which is elected a *giunta* or committee, which includes the assessors or heads of departments.

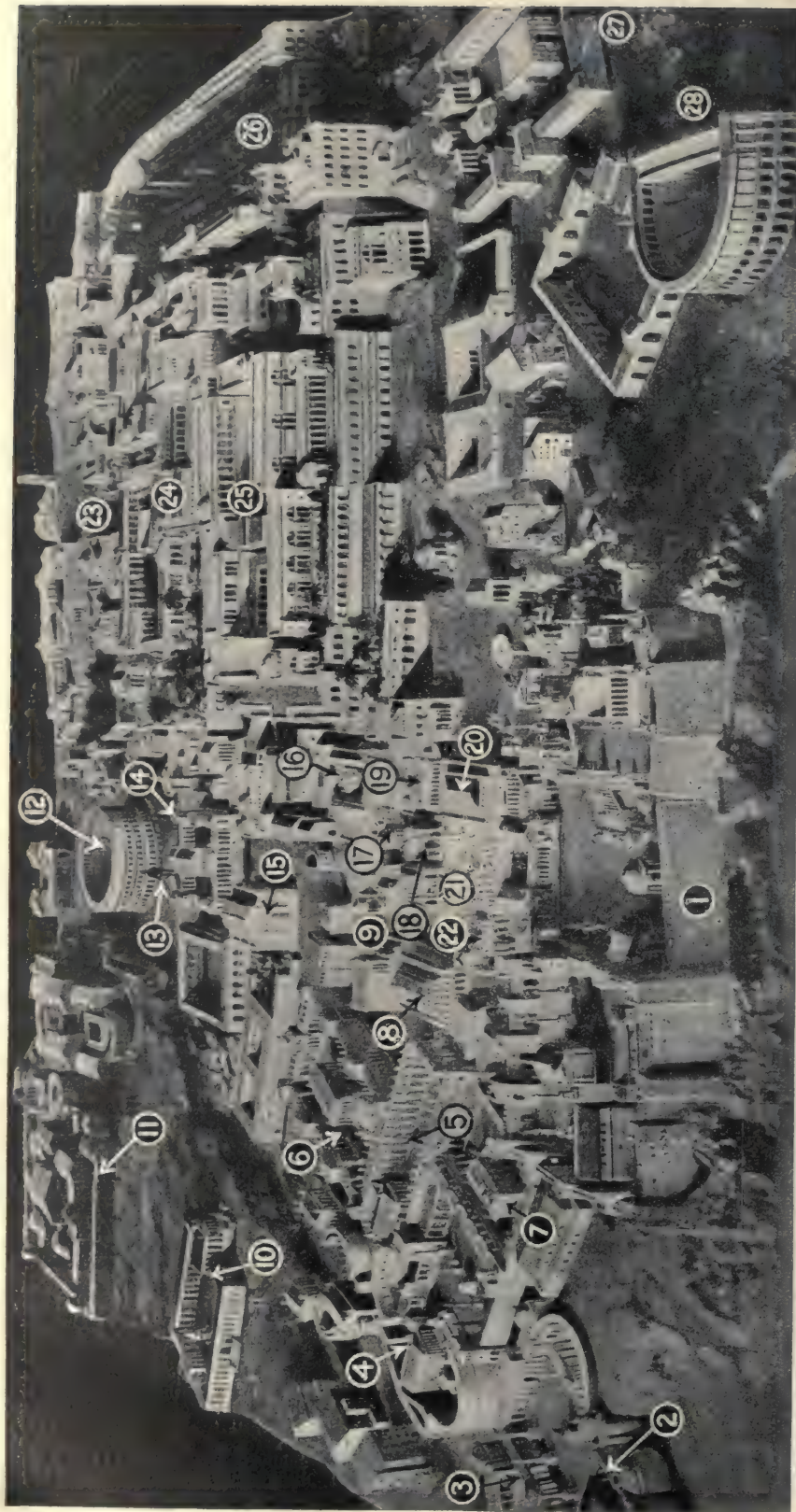
Rome is also the seat of government of the kingdom of Italy, and has a royal residence, the Quirinal

palace. Besides this, it is also the residence of the pope and his court; the Vatican, the Lateran, and the papal villa at Castel Gandolfo, in the Alban hills, are extra-territorial, and form no part of the kingdom of Italy. The population of Rome has increased rapidly since 1870, when it was only 226,022. This is mainly due to its importance as the seat of government and as a city visited by tourists, for it has no trade or industries.

Besides the many buildings of interest of all periods which it contains, Rome is richer in museums and picture galleries than almost any city in Europe, and this despite the fact that very many of the art treasures which it still possessed in the 18th century have since then been transported elsewhere. The archaeological, artistic, and ethnographical exhibition held in Rome in 1911 was

of great interest, and was less visited than it deserved to be.

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1. Capitoline Hill with its temples and many public buildings. 2. Basilica Ulpia. 3. Forum of Trajan, erected A.D. 111-114. 4. Forum of Augustus, built after the battle of Philippi, 421 B.C. 5. Forum of Nerva and Temple of Minerva. 6. Forum of Vespasian and Temple of Peace. 7. Temple of Venus. 8. Basilica Aemilia, built by Aemilius Lepidus, 179 B.C. 9. Temple of Antoninus and Faustina, dedicated A.D. 141. 10. Portico of Livia. 11. Baths of Titus and Trajan. 12. Colosseum. 13. Colossal statue of Nero as god of the sun, 118 ft. high. 14. Temple of Venus and Roma. 15. Basilica of Constantine, originally built by Victorius. 23-25. Imperial palaces on the Palatine Hill. 26. Circus Maximus, which held over 200,000 spectators. 27. The Velabrum quarter. 28. Theatre of Marcellus, completed 13 B.C., accommodating about 14,000 spectators.

16. House of the Vestals. 17. Temple of Vesta, where the sacred fire was kept alight by the Vestal virgins. 18. Triumphal arch of Augustus. 19. Temple of Castor and Pollux, built in 481 A.C. to commemorate the battle of Lake Regillus. 20. Basilica Julia, founded by Julius Caesar, 46 B.C. 21. Rostra, or platform from which the public orators made their speeches, erected by Augustus. Nos. 14 to 21 were included in the Great Forum. 22. Arch of Septimius Severus, erected A.D. 203 to commemorate the emperor's eastern victories. 23-25. Imperial palaces on the Palatine Hill. 26. Circus Maximus, which held over 200,000 spectators.

ROME: RECONSTRUCTION OF THE SOUTHERN AND MOST IMPORTANT PORTION OF THE ANCIENT CITY

From the reconstruction in plaster by Prof. Marcittiani

ROME: THE WESTERN EMPIRE

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This sketch of the history of the Roman empire is supplemented by articles on the emperors, Augustus; Nero; Trajan, and others; and on great Romans such as Julius Caesar; Scipio; while it is carried further in those on Byzantine Empire; Italy; Papacy. See also Carthage and entries on Plebeians; Senate; Tribune, and other institutions. For Roman literature see Latin and articles on Cicero; Tacitus; and other writers. See also Roman Law; Villa

The date accepted by Roman antiquaries for the foundation of Rome was 753 B.C. The earliest glimpses which we can get of the Romans present them to us as a community whose existence depended on agriculture and war. What is known as "land-hunger" played a very great part in Roman history. Early Rome must have been engaged in almost incessant warfare. The right bank of the Tiber was in possession of the Etruscans, alien to all other races of Italy, and the mountains in all directions were beset by turbulent raiders, Aequians, Volscians, and others. The inhabitants of the plains of Latium, the Latins, were closely akin to the Romans. Rome was originally a member of a confederation of Latin-speaking communities, of which she was a principal defensive outpost. Nothing but a very closely knit military and civil organization could have

enabled Rome to exist in the earliest period.

The Roman polity rested on an idea of authority in many respects unlike anything found in any other ancient state. The word for this was *imperium*, and its possessor in early days exercised absolute sway over all affairs, military, civil, and religious. That there was a monarchical period in Roman history, is made certain by many things that survived into the late Republican age. The change from monarchy to Republic involved, as Cicero says, no change in the quality of the *imperium*.

The changes were: (1) the *imperium* was put into commission and held jointly by two persons; (2) the tenure of it was limited to a year; (3) the whole body of burgesses, i.e. the whole body of warriors, had a voice in the appointment, as was natural, since the appointment was, first and

foremost, a choice of commanders over the army. The principle of collegiality was established in connexion with all offices subsequently created. Exercise of a function by an officer who had no colleague was very exceptional. The principal example is afforded by the dictatorship. The difficulties which would certainly arise from the exercise of power by two joint holders of equal privilege must have been foreseen on the institution of the Republic. They were met by the singular practice whereby either of the two principal magistrates (called *praetores* at first, afterwards *consules*) might nominate a dictator, who held supreme authority for six months over citizens and ordinary magistrates. He appointed a subordinate officer, called *magister equitum* (master of the horse).

The first great step made by Rome towards empire was by obtaining control over the Latin League of cities, of which she had been at first an equal member. This was achieved finally, after a good many generations of strife, in 338 B.C. on the close of a serious war. The control of the Greek cities in Campania was obtained about the same time, and soon after the Etruscan power, once the greatest



Rome. The city viewed from the dome of S. Peter's. In the foreground is the great piazza, beyond which flows the Tiber, with the Castle S. Angelo and the houses of parliament on its left bank. In the distance, on the right, is seen the marble monument to Victor Emmanuel.

in Italy, was subjugated, and by the beginning of the 3rd century B.C. Rome had the control of the whole peninsula. The complete domination of some parts of it was not, however, attained until later times. Thus the Ligurians, in the mountain regions above the Riviera, and the Gallic tribes on the Alpine slopes were not completely subjugated until the age of the emperor Augustus.

In this course of conquest in Italy Rome adopted a policy towards conquered peoples which was continued outside Italy and was the principal cause for her rise to empire. She kept all foreign relations in her own hands, but interfered as little as possible in the internal government of the subject communities or tribes. And she was most moderate in the burdens cast upon her subjects. The chief requirement was that of military service, which the primitive peoples were ready to give. Taxation was seldom required of Italians. This politic moderation on the part of Rome explains why Rome was the only ancient city state which succeeded in founding a stable empire.

Struggles with Carthage

The Greek cities of S. Italy struggled continually against the Italic barbarians, Lucanians, Brutians, and others, and from time to time had summoned Greek commanders to their aid. The venture of Pyrrhus, king of Epirus, who came over to aid Tarentum early in 280 B.C., brought Rome on to the southern scene, and completed her ascendancy in Italy. One result of this contest was a rupture between Romans and Carthaginians, who had previously been allies. After three great struggles (264-241 B.C., 218-201, and 149-146) Carthage was utterly destroyed. The first war was chiefly naval in character. It resulted in the first Roman annexation outside the peninsula, the Carthaginian possessions in Sicily. Immediately after this event Corsica and Sardinia were wrested from Carthage.

In 230 and 219 wars were waged against the Illyrian pirates, and some points occupied on the Eastern Adriatic shore. Rome was thus brought into political contact with the communities of Greece proper. Philip V of Macedon allied himself with Hannibal, and the Aetolian Confederation with Rome, during the Second Punic War. Immediately after Hannibal had departed, war was declared against Philip, who was overthrown by Flaminius at the battle of Cynoscephalae, in 197 B.C. In the following year Flaminius declared the "liberation" of Greece, following the an-

cestral Roman policy of respecting the internal autonomy of the separate cities, while looking with disfavour on leagues or combinations of cities or tribes.

Philip was crippled by this measure of "liberation," but the Romans annexed for themselves none of his territory. Philip had been aided by Antiochus, king of Syria, who was next attacked by Rome. After his crushing defeat at Magnesia, 190 B.C., he was treated very much as Philip had been. Roman allies, Eumenes king of Pergamum, and the Rhodians who headed a confederation of commercial cities, received accessions of territory. Philip, who had rendered very important assistance against Antiochus, was shabbily treated and consequently nursed dreams of revenge.

In the contests with Philip and Antiochus, two great Greek federations, one of the Aetolian, and the other of the Achaean cities, had been deeply concerned. The discontents and dissensions generated by the struggles led ultimately to the violent suppression of both by the Romans, the former in 189 B.C., the latter in 146, when Corinth, the great Achaean centre, was razed to the ground.

At the end of the Hannibalic War, only a narrow band of territory in Africa had been annexed. In 146 it was enlarged. The Third Macedonian War, against Perseus, concluded by the victory of Pydna, 168 B.C., made an end of the Macedonian monarchy, and Achaea, with Macedonia, went to form a province. From the time of the Second Punic War onwards the Romans had been occupied by strenuous struggles to establish their ascendancy in Spain, suffering from time to time great disasters. The capture of Numantia by the younger Scipio in 133 gave them more security, but Spain was still turbulent in the time of Augustus. In 133 the last king of Pergamum bequeathed his dominions to Rome, and they became the Roman province of Asia. About the same time the first steps were taken towards the conquest of Gaul. In 124 Aquae Sextiae (Aix in Provence) was founded, and six years later the Roman colony of Narbo (Narbonne), the first organized Roman settlement outside the peninsula.

Measures of the Gracchi

In the period from 133 to 121 the revolutionary measures of the Gracchi were carried out, and the supremacy of the compact ring of noble families which had controlled the Senate was undermined. The chief measures were: (1) the vindication of public ownership in

the national estates. (2) The constitution of the *equites* as a separate order. (3) The attempt to found great Roman colonies across the seas. Gaius Gracchus proposed to enfranchise the Italian allies. The refusal to pass this measure led a generation later to the Social War, which had for its result the acquisition of Roman citizenship by all the cities of Italy, by the *lex Iulia* of 90 B.C. The conception that men of Italian birth formed a people apart from the rest of the empire was now definitely established, with important consequences.

End of the Republic

The last annals of the Republic were filled with the struggles for control of the Roman polity between military commanders—the Scipios, Marius, Sulla, Pompey, Julius Caesar, and Mark Antony—and then the Republic perished. The imperial system itself emerged from a great scene of bloodshed, within and without Italy. The final decision in favour of Augustus at the great naval battle of Actium raised him to undisputed dominance in 31 B.C. Julius Caesar merely destroyed the Republic; and paid the penalty with his life. His successor had what he had not, the constructive spirit. So vast a transformation was surely never carried through with such consummate ease.

In the preceding century great portions of Asia Minor, also Egypt and Gaul and lands by the Danube, had been incorporated in the empire. An actual autocracy was established, so cunningly veiled that its methods presented themselves to the Romans as a natural and easy development from those of the Republic. A world weary of war greeted gladly one who posed as a prince of peace.

Such quietude and material prosperity as subsisted with few interruptions for two centuries, had never been known to the ancient world since the dawn of history. Even the extinction of the great founder's line when Nero perished, A.D. 68, shook the foundations of the imperial edifice but little. The commotion which swept away Nero was due to a consciousness among the legionaries, posted by Augustus in great permanent camps on the boundaries of the empire, by Rhine, Danube, and Euphrates, that the imperial power rested on their support, and might be bestowed by their grant. The Julio-Claudian line was succeeded by the nominees of the Eastern forces in the person of Vespasian; then there was an interlude under Nerva, when the Senate, whose formal right to a voice in the

appointment of an emperor had been recognized from the first, succeeded in making the right effective.

Then followed soldier emperors of great ability, Trajan and Hadrian, and after them the Antonines, the best governors of the whole imperial period. The philosopher-emperor Marcus Aurelius gave place to a feeble and vicious son, Commodus; on his assassination, A.D. 180, military nominations followed for several generations, often due to anarchic action by the legions, each great army striving to set its commander on the throne, in order to secure the largess to be obtained by success. The 3rd century was chaotic from this cause, until some men appeared whose powers were strong enough to give them secure control.

Aurelian and Diocletian

Aurelian, in 270, found the empire ready to crumble away owing to internal weakness and dissensions, and the formidable assaults of Germanic tribes, chiefly the Goths, Franks, and Alamanni. The pressure of the barbarians was due greatly to need of land, in large part caused by tribes in the far East, driven westward by the same necessity. The emperors adopted the policy of allotting vacant lands within the empire to the newcomers from time to time, in return for military service, an utterly ineffectual policy. Large portions of the empire rapidly passed from civilization to barbarism. To a great extent these aliens filled the ranks of the army, and high officials of patently barbaric origin swayed the destinies of the empire. In 282 a vigorous emperor, Probus, was murdered by his soldiers, and after an interval of confusion Diocletian, one of the greatest of the emperors, succeeded, and a new era began for the empire.

After Augustus, Diocletian was the greatest political organizer that Rome ever had. He tried to reconstitute all the imperial institutions in such a manner as to remove a number of sores which were threatening destruction to the body politic. (1) He tried to devise a method whereby succession to the throne should take place peacefully. He placed the supreme power in commission. There were to be two emperors-in-chief, called Augusti. Each of these was to nominate an assistant to bear the title of Caesar, and at the end of 20 years' tenure of office, the Augustus was to retire, being succeeded by the Caesar, who would have received a thorough training for the work of a ruler. For administrative purposes, the empire was divided

into two spheres, an Eastern and a Western, and each of these spheres again into two. In practice the four sections had for their superintendence one of the four imperial personages, while the two Augusti settled matters of universal concern in common.

(2) The provinces were split up into smaller portions. It would thus be very difficult for an ambitious governor to find sufficient resources near at hand to make himself dangerous to the supreme authority. Diocletian preserved the provincial councils, a very beneficial creation of Augustus. (3) The complex hierarchy of officials was thoroughly reorganized with a view to efficiency. (4) The immobility of the legions, stationed by Augustus permanently on the frontiers, had conduced to chaos, and Diocletian created a mobile army. (5) A great council of the Empire (*Consistorium*), with definite constitution and powers, was organized. (6) A vast and urgently needed reform of the coinage was begun, and completed by Diocletian's successor, Constantine. (7) A great and uniform organization of finance was undertaken. The land became the chief basis of taxation.

Growth of Despotism

The whole scheme was but partially successful, but it undoubtedly stayed the previously imminent ruin. Several processes, which had been for many generations gradually stealing over the empire, now reached their full development. (1) The monarchy, at first a despotism unavowed, and for that very reason less oppressive, now became frankly autocratic. (2) The empire started as in essence a vast confederation of communities invested with a great degree of local autonomy. But the central power had been continually encroaching on the privileges of the innumerable civic communities of the empire. These were ruined by bad financial administration, which was aggravated in some respects by the changes which Diocletian introduced.

Responsibility for the production of the taxes was laid on the municipal councils, with the result that local interest and initiative were paralysed. No one of the causes which can be assigned to the fall of the Roman empire was more potent than this. (3) A disastrous tendency developed towards a kind of social caste system. Caracalla, in 212, had made all the subjects of the empire citizens with nominally equal privileges before the law; but these privileges came to be of little value to the general mass. By the require-

ments of the state, men were deprived of anything like free choice in ordering their lives. Thus sons of soldiers were obliged to adopt the military career.

The class from which municipal councillors were drawn were subjected to such compulsion that any method of escape was welcome, even that of ordination in the Church—for the Christian empire left the clergy free. In the eye of the government the real object of the cultivator's existence was to produce taxes; he therefore sank into serfdom, and his children after him. So the greater part of the world became bound in chains. (4) A progressive Orientalisation of the Imperial Court took place, which rendered it a hotbed of intrigue. The Eastern idea that a monarch is in some sense divine, introduced by Augustus, thoroughly transformed the atmosphere. The whole public service became servile and corrupt.

Acceptance of Christianity

The attempts made to cure these evils ever became more strenuous and severe, and always failed. (5) The old Roman Senate, treated with outward respect by Augustus, became little more than a local council for the city of Rome. (6) Italy lost her pride of place, and became even as the extra-Italian provinces. (7) The official acceptance of Christianity by Constantine introduced a disastrous intermingling of politics and religion. Heresy now became a thing of infinite political consequence. (8) Rome was deprived of its pre-eminence by Constantine, who in 330 gave the famous old Greek city Byzantium a new name, Constantinopolis, after himself. The new capital was settled after the model of old Rome. Even in Italy, old Rome ceased to be the unrivalled city of the rulers. Late emperors held court frequently at other places, especially in the cities of Milan and Ravenna.

In 337 Constantine died. In the following year the three Augusti, his three sons, divided the empire. The East fell to Constantius, Illyria and adjacent parts to Constantine II, and the West to Constans. A year after this partition Constans attacked and killed Constantine II, and annexed his dominions. In ten years' time a formidable pretender, Magnentius, drove Constans to his death, and reached Rome. In 351 Gallus, nephew of Constantine and brother of Julian the Apostate, was recognized as Caesar, and Magnentius was overthrown by Constantius, at Mursa in Pannonia.

In 360 Julian became Caesar and Constantius died. Next year Julian

entered Constantinople as emperor, and re-established the old heathen cults. On his death in the war with Persia the soldiers raised to the throne Jovian, who reinstated the Christian religion. Jovian was assassinated, and Valentinian I, the son of a Pannonian peasant, became Augustus, and bestowed the same honour on his brother Valens. Valentinian established himself at Milan, Valens at Constantinople. Procopius, a trusted officer of Julian, raised the standard of revolt against Valens in Constantinople, 365, but lost his life in the next year. Valentinian, on the whole a strong general, and successful for long against the barbarians, died on a campaign in 375. Valens, while operating against the Goths, suffered at Hadrianopolis a terrible defeat, which forms a turning point in history, and lost his life. His nephew Gratian assumed as colleague a stout and successful soldier, Theodosius.

In 382 Gratian removed from the Roman Senate-house the altar of Victory, the last heathen symbol that remained there. He was treacherously captured and killed, 383, by an upstart emperor, Maximus, in Gaul, where a Frankish general, Arbogast, who had held the real power for some years, nominated Eugenius as emperor, intending to rule through him. A great struggle between forces from the West, chiefly Franks and Gauls, and the army of Theodosius from the East, took place on the river Frigidus, near Aquileia, where Theodosius won a great victory and Eugenius was killed; Arbogast committed suicide 388, and Valentinian resumed control of the West, but met his death in 392. In 395, on Theodosius's death, his son Arcadius became ruler of the East; another son, Honorius, had been declared Augustus in the West the year before his father's death, with Stilicho as his general. This involved the real, though not nominal, division of the Roman empire into two empires.

Domination of the Germans

The consequences of this split are obvious in Europe to this day. Stilicho held the Gothic chief Alaric in check for a while, but in 400 Alaric made his way into Italy; however, in 402, Stilicho won over him two great victories at Pollentia and Verona. In 405 another barbarian, Radagaisus, penetrated Italy, but he and his forces were destroyed by Alaric. Gaul also at this time was being ravaged by the barbarians. But long ere this the Germans had become the controlling element in the European dominions of Rome. Both military

and civil services were controlled by men of Germanic origin, and large districts were peopled by their kinsmen.

Only a few more incidents in the dying agony of the Western empire remain to be mentioned. By the end of the first quarter of the 5th century the Goths had overrun Italy and Gaul; the Franks and Alamanni held the Rhine-lands, Vandals and Germans were in Spain, Vandals were in Africa. In 439 they possessed themselves of Carthage, the great and brilliant stronghold of Roman civilization there. Shortly afterwards Attila led his hordes of Huns to the plunder of the Eastern empire. In 451 he reached Gaul, where he suffered a tremendous defeat at the hands of Theodoric the Visigoth, near Châlons. In 453 he died in Rome, which had been sacked by Alaric in 410, was plundered by Vandals in 455, and once more by Ricimer, a pure German, who had been made commander of the armies of the West. Again and again he set up shadowy emperors according to ancient form, but was real ruler himself.

ROME: ITS ART AND ARCHITECTURE

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In addition to the illustrations herewith, Roman art is illustrated under a great number of headings throughout this work. These include Aqueduct; Arch; Capitol; Colosseum; Forum; Pantheon; S. Peter's and those on the cities where Roman remains exist, e.g. Nîmes; Praeneste; and others. See also Art; Architecture; Etruria; Numismatics; Pottery

The Romans were not by nature highly endowed with the artistic faculty, and during the Republican period, when they were engaged in a perpetual struggle, they were, as a rule, content to employ the services of foreign artists, whether Greek or Etruscan, in the erection and adornment of their temples and other buildings. Examples of Roman craftsmanship, such as the *cista* or engraved casket made by Novios Plautios, and found at Praeneste, show a close adherence to Greek models.

We can, however, trace connexion between Etruscan art—especially in the realism of its portraiture—and that which afterwards flourished in Rome. Again, even in republican times, the art of the Romans was closely wedded to history. We possess a fragment of an historical painting from the Esquiline, which seems to represent episodes of the Samnite wars, and reminds us of the traditions of Fabius Pictor (the Painter), who adorned the temple of Salus with frescoes in 304 B.C., and of the paintings carried in triumph by successful generals. An impulse

The last titular emperor, named by an irony of destiny Romulus Augustulus, 476, was pensioned by the barbaric leader Odoacer. Europe had already been parcelled out into barbaric kingdoms.

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was given to the art of portraiture by the practice of setting up waxen busts of the more famous members of the great families of Rome in the *atria*, or courts of their houses. These may have been at first derived from death-masks, but in time marble busts were substituted, and by the last century of the Republic we find a flourishing school of portraiture in existence. Caesar, Pompey, and Cicero are all represented in extant busts.

The enormous increase in wealth due to the conquests of Rome and the diffusion of Hellenic culture, led to the collection of Greek masterpieces, great numbers of which were transported to Rome by victorious generals, and to the multiplication of copies for the decoration of the palaces and villas of those who could not acquire originals; and a school arose in which, instead of direct copying, adaptation of earlier Greek types was practised. Its founder was Pasiteles, a contemporary of Caesar.

The establishment of Roman supremacy in the Mediterranean world naturally made the capital a centre of artistic production, and

Augustus was not slow to turn this to account. It is, of course, difficult to say how far the works which may be assigned to his reign were the product of Roman craftsmen; but at least we may see a truly Roman spirit in the close association of art with history. The statue of Augustus himself from Prima Porta, with its allegorical decoration and accessories, is the first, but also the finest, of the series of imperial statues.

In addition to sculpture, other arts, such as those of the gem-engraver and the silver chaser, were made to serve the ends of the dynasty. The *Grand Camée* of the Bibliothèque Nationale represents Tiberius and Livia, above whom the deified Augustus hovers; the silver cups from the villa of Bosco Reale, near Pompeii, now in the Rothschild collection, bear reliefs which celebrate the triumphs of Augustus and his successor. But the most perfect expression of Roman-Imperial art is found in the historical monuments decorated with reliefs, which begin with the Ara Pacis Augustae, executed between 13 and 9 B.C., to celebrate Augustus's pacification of the West, several slabs of which have been preserved.

Pompeian Art

The triumphal arch and the trophy, especially the former, gave free scope to this form of national art. At the same time, we can form some conception of the art which ministered to private luxury from the series of decorative wall-paintings from Rome and Pompeii, in which two parallel tendencies, one towards the creation of an illusory outlook on to an external landscape, and the other towards the representation of the masterpieces of easel-painting, exert a mutual influence. A good example is the wall of the dining-room in the house of Livia on the Palatine. Impressionist landscape is a common form of decoration, and stucco is used with remarkable skill for like purposes. The combination of both—as the scanty surviving fragments, compared with certain tomb-decorations, prove—achieved its culminating triumph in the decorations of the Golden House of Nero.

The comparative lack of public monuments belonging to the Julio-Claudian period is compensated for by their abundance in that which follows. Under the Flavian emperors Roman sculpture reached its zenith; the reliefs of the arch of Titus solve the problem of giving the atmosphere, which painting supplies by more direct

means, to compositions which retain full plastic effect. The best portraits of this period are masterpieces of art, giving the essential and significant traits of the subject without meticulous detail.

In the reign of Trajan the technical perfection of execution rapidly declined, but historical art entered on a new phase with the spiral reliefs of the column set up in the Basilica Ulpia, which tell the story of the emperor's Dacian wars, in what has been termed the "continuous style," usually unfolding its successive scenes as on a scroll, but sometimes summing up the narrative in a broad panorama. We begin in this period to see the tendency to overcrowding, and the objection to vacant intervals which leaves no space unadorned. The triumphal arch of Trajan, at Benevento, the reliefs of which are full of historical significance, and almost fulfil the function of an Imperial programme, is thus overcharged with ornament. Roman sculptors, again, excelled in the execution of barbarian types, statues of captives playing a large part in the decoration of triumphal monuments; and in the reign of Hadrian, whose Greek tastes led to a revival of classicism, personified provinces were added. The portraits of the Emperor's deified favourite Antinous furnish the best illustration of the tendencies of the time.

Declension of Standards

Throughout the succeeding period we can trace a gradual declension from the classical Hellenic standard, and the invasion of new artistic principles, which are thought by many critics to be derived from the East. Sculpture endeavours by an increased use of chiaroscuro to obtain some of the effects of painting, but fails to convey the impression of movement in a free atmosphere, and has to be content with that of an intricate pattern of lights and shadows. Various experiments are made, such as the detachment of puppet-like figures from the background in a relief from the base of the Antonine column; and the sense of proportion and perspective is lost in the bird's-eye reliefs from the Arch of Septimius Severus. The sarcophagi of the wealthy, which represent to us the private art of this time, show the same tendencies in their crowded compositions. Portrait sculpture, however, remains at a high level, especially in the amazingly frank characterisation of the busts of Caracalla. In the decoration of private houses mosaic played an important part, and here, too, artistic tradition was

well maintained, and taste in decoration declined but slowly.

The 3rd century A.D. was a time of strife and decay, and art is mainly represented by a series of imperial portraits, many of which are still of remarkable excellence. That of Philip the Arabian, rough as the artistic methods are, is a marvellous character study, and there was even a revival of art in the troubled times of Gallienus, as that emperor's busts prove.

Economic exhaustion hastened the decay of art, and when order was re-established by Diocletian and Constantine, the impulse given by Hellenism was practically exhausted, and, with the triumph of Orientalism, sculpture virtually ceases to be the embodiment of life, and becomes purely monumental, though in its best examples—such as the colossal portrait of Constantine—undeniably grandiose. Symmetry and frontality, the marks of primitive art, characterise the reliefs of this time, e.g. on the arch of Constantine, and in fact we are in the presence of the death of an old and the birth of a new—i.e. Christian—art, which works up what remains of the historical and monumental genius, informing Roman imperial art in the service of the conquering religion.

Besides the art whose story we read in the imperial monuments, the handicrafts flourished under the early empire. Gem-cutters and die-sinkers excelled in their several spheres, and the imperial coin portraits and medallions embody much first-class workmanship. The provinces, too, had their schools, in which pottery, brasswork, and sculpture, often valuable for its realism, set up centres of artistic tradition. The tombstones and other monuments of Roman officers or rich provincials furnish the best examples of this. Even in Britain, sculpture was a living art, as is witnessed by the Gorgon, which decorated the pediment of a temple at Bath.

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Rome. City of Georgia, U.S.A., the co. seat of Floyd co. It is situated at the confluence of the Oostanaula and Etowah rivers, 71 m. N.W. of Atlanta, and is served by the Southern and other rlys. The buildings include the city hall. Peaches and other fruit, grain, and cotton are important products of the locality. Tanning, iron-founding, and the manufacture of machinery, cotton, hosiery, furniture,

planing mill products, and cottonseed oil are leading industries. Rome was settled in 1834, and became a city in 1847. Pop. 13,300.

Rome. City of New York, U.S.A., a co. seat of Oneida co. It stands on the Mohawk river, 16 m. N.W. of Utica, and is served by the New York Central and the New York, Ontario, and Western Rlys., and the Erie, New York State Barge, and Black River canals. It contains the Rome Free Academy and the Jervis library. Among its manufactured products are brass, iron, and copper ware, canned goods, motor vehicles, locomotives, and knitted goods, and cheese and butter are also produced. Founded in 1796, Rome was incorporated in 1819, and became a city in 1870. Pop. 26,300.

The spot where Rome stands was, in the 18th century, an important portage on the route from the valley of the Mohawk to Lake Ontario. The Indians used and named it, and early in the century the English built forts hereabouts, which were attacked by the French. In 1756 a new fort, called, after its builder, Fort Stanwix, was erected, its name being afterwards changed to Fort Schuyler. Held by the colonists on the outbreak of the war of independence, it was besieged in 1776 by a British force,

but this was compelled to retire. The defence made was a great encouragement to the Americans, and it is said that the name of Rome was given to the town that sprang up on the spot because the republic had been defended heroically here.

Rome-Fee or **ROME-SCOT.** Name for the hearth tax imposed by the pope on England and other countries, subsequently known as Peter's Pence (*q.v.*).

Romeo and Juliet. Tragedy by Shakespeare. Romeo, a Montague, and Juliet, a Capulet, fall in love and are secretly married. Romeo's friend, Mercutio, being killed by Juliet's cousin Tybalt, in a brawl arising from the rivalry of the Montagues and the Capulets, Romeo kills Tybalt, and is banished from Verona. Her people plan to marry Juliet to Count Paris, while she, seeking advice from Friar Laurence, who married her to Romeo, swallows a powerful sleeping potion, and is laid, as dead, in the family tomb. A message sent to Romeo miscarries, Romeo and Count Paris meet at the tomb, Romeo kills the count, and, thinking Juliet dead, poisons himself by her side. Juliet awakens, and, seeing the dead Romeo, fatally stabs herself with his dagger. The family feud ends over the dead bodies of the lovers. The tragedy is light-

ened by the characters of Mercutio and Juliet's old nurse. The scenes are laid in Verona and Mantua.

The story appeared in the Novellino of Masuccio di Salerno, 1476; was told by Luigi di Porto, as *The Story of Two Noble Lovers*, printed at Venice, 1535; was retold by Bandello, 1554; told again, in French, by Boastuau, whose version formed the basis of a poem by Arthur Broke, 1562, and was translated in *Painter's Palace of Pleasure*, 1567. Shakespeare's play was written and probably acted in its first form as early as 1591, was first published in a mutilated form in 1597, other

quartos following in 1599 and 1609, the last named supplying the basis of the folio text of 1623. Of its 3,002 lines, 405 are prose, 2,111 blank verse, and 486 pentameter rhymes. A notable modern revival was that at The Lyceum, London, Sept. 21, 1895, when J. Forbes-Robertson played Romeo and Mrs. Patrick Campbell Juliet. See Anderson, Mary.

Römer, OLE, OLAF, OR OLAUS (1644-1710). Danish astronomer and mathematician. Born at Aarhus, Jutland, Feb. 25, 1644, and educated at Copenhagen University, he went to Paris in 1671, where he became teacher of the dauphin and a member of the Academy. He was appointed professor of mathematics and director of the observatory at Copenhagen, 1681, and died there, as burgo-master, Sept. 19, 1710. Römer was the first man to discover that light was not instantaneous, and he calculated its speed from observing an eclipse of the first moon of Jupiter. He was the inventor of the astronomical instrument known as the meridian circle.

Romer, SIR ROBERT (1840-1913). British lawyer. Born Dec. 23, 1840, his father, Frank Romer, was a music composer. Educated at Trinity Hall, Cambridge, he was senior wrangler in 1863. Fellow of Trinity Hall, he was professor of mathematics at Queen's College, Cork, 1865-66, but this he quickly abandoned for the law. Called to the bar in 1867, he earned a great reputation as a chancery lawyer, and in 1890 was made a judge. In 1899 he was chosen a lord justice of appeal. Römer married a daughter of Mark Lemon. He retired in 1906 and died March 19, 1913.

Romford. Urban dist. and market town of Essex, England. It stands on the Rom, a small tributary of the Thames, 12 m. N.E. of London, and is served by the G.E.



Romeo and Juliet. The meeting of the lovers on the balcony of Juliet's home

From the painting by Frank Dicksee, R.A.



Romford, Essex. Parish church of St. Edward

and London, Tilbury and Southend Rlys. The principal building is the modern church of S. Edward the Confessor, the successor of a much older one. The main industry is brewing, but there are engineering and other works. Cattle and corn markets are held. The Romans had a station called Duro-lum here, and in the Middle Ages Romford was the chief place in the liberty of Havering, which ceased to exist in 1892. An arterial road from Woodford and Wanstead to Romford was begun in 1921. Market day, Wed. Pop. (1921), 19,448.

Romilly, JOHN ROMILLY, 1ST BARON (1802-74). British lawyer. Son of Sir Samuel Romilly, he was born Jan. 10, 1802, graduated at Trinity College, Cambridge, 1823, and was called to the bar in 1827. He entered the House of Commons, 1832,



1st Baron Romilly.
British lawyer

became solicitor-general, and was knighted in 1848. Attorney-general, 1850, he became master of the rolls, 1851. He introduced various chancery reforms and was the last master of the rolls to sit in the House of Commons. Created Baron Romilly of Barry in 1865, he resigned his mastership of the rolls in 1873, and died in London on Dec. 23, 1874.

Romilly, SIR SAMUEL (1757-1818). British legal reformer. Born, of Huguenot descent, in London, March 1, 1757, he had a private education and entered Gray's Inn in 1778, being called to the bar in 1783. He was deeply influenced by his study of Rousseau, the *Encyclopédistes*, and Beccaria, and became a strong advocate of humanitarian principles in criminal law. In 1806 he became solicitor-general, and sat in Parliament, 1806, 1812, and 1818. He secured the abolition of the death penalty for certain classes of petty theft, and consistently supported measures of reform and emancipation. An able speaker and a learned lawyer, he cut short a distinguished career by suicide, Nov. 2, 1818, following on the death of his wife. See his *Memoirs*, ed. by his sons, 1840.



Sir S. Romilly,
British lawyer
Sir T. Lawrence

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Romilly-sur-Seine. Town of France, in the dept. of Aube. It stands on the left bank of the Seine, 23 m. N.W. of Troyes. It has locomotive works, stocking and needle factories. In the Cistercian abbey of Scellières, 2 m. N.W. of the town, the body of Voltaire was interred in 1778, but was transferred to the Panthéon in Paris, 1791. Pop. 10,000.

Romney, New. Mun. borough of Kent, England, one of the Cinque Ports. It is 75 m. from London and 8 m. from Hythe, with a station on the S.E. & C. Rly. The chief buildings are the church of S. Nicholas, mainly Norman, and the town hall containing a collection of documents relating to the Cinque Ports. In the Middle Ages Romney was the chief of the Cinque Ports and a corporate town governed by jurats. In the 13th and 14th centuries the encroachments of the sea destroyed its fine harbour, and it is now about a mile from the coast. It sent two members to Parliament 1266-1832. A large sheep fair is held. Littlestone-on-Sea is part of the borough. It is called New Romney to distinguish it from Old Romney, a village 2 m. to the W. Pop. 1,500.



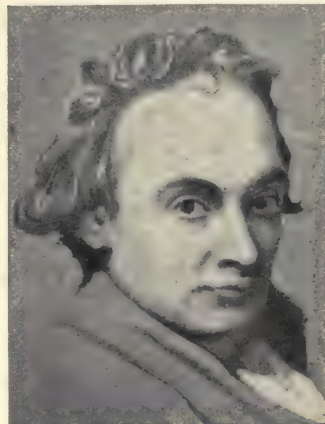
New Romney
borough seal

Romney, EARL OF. British title borne since 1801 by the family of Marsham. Sir John Marsham, who belonged to an old Kentish family, was a clerk in the court of chancery. He became an M.P., and in 1663 a baronet. His descendant, Sir Robert Marsham, the 5th baronet, governor of Dover Castle and M.P. for Maidstone, was made a baron in 1716. His grandson Charles, the 3rd baron, also an M.P. before succeeding to the title, was made earl of Romney in 1801. In 1905 Charles Marsham (b. 1864) became the 5th earl. His eldest son is called Viscount Marsham.

There had been an earlier earl of Romney, Henry Sidney (1641-1704), a son of Robert Sidney, 2nd earl of Leicester. He was a courtier in the time of Charles II, who sent him to represent him at The Hague. Afterwards he supported William of Orange, and was made a baron in 1689. Under William he was a secretary of state, lord-lieutenant of Ireland, and master-general of the ordnance. Created earl of Romney in 1694, he died unmarried, April 8, 1704.

Romney, GEORGE (1734-1802). British painter. Born at Dalton-in-Furness, Dec. 15, 1734, he had a

scanty education, and for a time worked with his father, a cabinet-maker, studying drawing in spare moments. Apprenticed to Edward Steele, a portrait painter, in 1755, he worked at various places in the north of England, and in 1762 settled in London. His first pictures of note were *The Death of Wolfe*, 1763, purchased for the council chamber at Calcutta, and *The Death of King Edmund*, 1765. In 1764 he stayed for a short time in Paris. Slowly building up a connexion as a portrait and subject painter, he prospered sufficiently to visit Italy, 1772-74, where he made copies of many famous pictures,



George Romney, British painter
From a self-portrait in the National
Portrait Gallery, London

especially of Raphael's Transfiguration, the altar-piece at Montorio. On his return he became fashionable and a rival of Reynolds, painting, among others, the duke of Richmond, then president of the Society of Arts, Lady Warwick and her Children, "Perdita" Robinson, and Lady Russell and Child.

From 1782-85 most of his attention was devoted to Lady Hamilton, of whom he painted many character portraits. After her departure for Naples he turned out a great quantity of work until 1789, when ill-health caused him to retire. He died at Kendal, Nov. 15, 1802. Romney's best known pictures were the portraits of Lady Hamilton, and examples of his work are in the National and the National Portrait Galleries, London. See Cumberland, R.; Craven, Lady; Jordan, D.; Newdigate, Sir B.; Paine, T.; Parker, Sir H.; consult also Lives, W. Nayley, 1809; H. E. Maxwell, 1902; Romney and His Art, H. Gamlin, 1894.

Romney Marsh. Extensive level tract of rich pasture land in Kent, England. It is protected

against the encroachment of the sea by an earthen embankment stretching from New Romney to Hythe. Managed by a corporation, it contains several villages.

Romny OR ROMEN. Town of S. Russia. It is in the govt., and 100 m. N.W., of Poltava, at the junction of the Romen and the Sula on the Libau-Romny rly. The chief industries are the manufacture of leather goods, boots and shoes, tobacco, and agricultural machines. Pop. 23,000.

Romö. Danish island in the N. Sea. One of the N. Frisian group, off the coast of Slesvig, it is 9½ m. from N. to S., and 3 m. from E. to W. Kongsmark and Kirkeby villages are on the E. shore, and Lakolk, a sea-bathing resort, on the W. Pop. 1,200.

Romola. Historical romance by George Eliot. First published serially in *The Cornhill Magazine*, July, 1862–Aug., 1863, it was issued in book form in the latter year. The scene is laid in Florence at the end of the 15th century, and in the book is introduced the story of Savonarola's career and martyrdom. It is a very close and detailed account of Florentine history.

Romorantin. Town of France. In the dept. of Loir-et-Cher, it stands at the confluence of the Sauldre and the Morant, 37 m. N.W. of Bourges. There are cloth and cotton factories and oil refineries. Romorantin was formerly the capital of Sologne and belonged to the counts de Blois in the 12th century. It was captured by the Black Prince in 1356. In the 15th century it passed to the dukes of Orléans, and later to the dukes of Angoulême. The celebrated edict of Romorantin in 1560 prevented the establishment of the Inquisition in France. Pop. 8,000.

Romsdal. Valley of the Rauma, central Norway. It runs S.E. from the S. arm of the Romsdal Fiord, and is dominated by the Romsdalshorn, 5,095 ft., and the Trolltinder (witch needles), some 6,000 ft. high. Aandsnes, at the head of the fiord, is the terminus of the road up the valley and across the plateau to the Gudbrandsdal, wherein is the new trunk rly. from Christiania to Trondhjem. In the valley are wild reindeer. Cod and herring fishing is carried on.

Romsey. Mun. borough and market town of Hampshire, England. It stands on the Test, 10 m. from Southampton, with a station on the L. & S.W. Rly. The chief building is the beautiful church, originally that of a Benedictine nunnery. Dedicated to S. Mary, its proportions resemble those of a cathedral; it is almost entirely



Norman in style, and is regarded as perhaps the finest building of its kind in the country. There are an agricultural trade and manufactures of paper and leather. Romsey grew up around a religious house for women founded by Edward the Elder about 910, and governed by the abbess. It became a chartered town in 1608,

and was a centre of the woollen trade. Near is Broadlands, once the seat of Lord Palmerston. Market day, Thurs. (alternate). Pop. 4,700.

Romulian Calendar. Division of the Roman year, traditionally ascribed to Romulus, and divided into ten months only, comprising in all 304 days. In the reign of Numa two more months were added. See *Calendar*; consult also *The Calendar*, A. Philip, 1921.

Romulus. In ancient Roman legend, the founder of the city of Rome. He was represented as a son

of Mars by Rhea Silvia, daughter of Numitor, son of the last king of Alba Longa. Numitor's brother Amulius had made Rhea a vestal virgin vowed to perpetual chastity, so that she should have no children to claim the



Romsey, Hampshire. Old Swan Inn and Church Street; top, left, abbey church of S. Mary, from the south-east

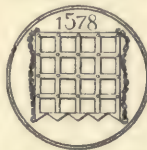
Frith & Valentine

throne which he had seized. When her twin sons Romulus and Remus were born, mother and children were cast into the river by

order of Amulius. The children in their cradle drifted ashore and were suckled by a she-wolf. Discovered by a shepherd, the boys were brought up by him, and on reaching manhood slew the

usurper Amulius and reinstated their mother's father Numitor. They then proceeded to found a city on the Palatine Hill, and

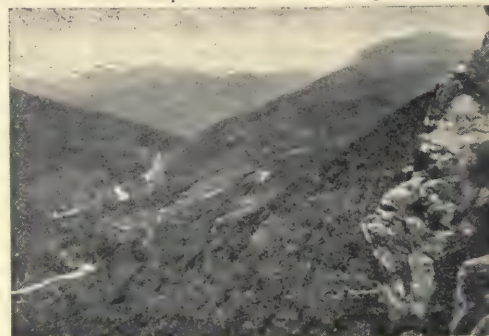
when the walls were built, Remus leapt over the walls to show his contempt for them. This so enraged Romulus that he killed his brother. A motley crowd gathered round him in the new city, and in order to provide his people with wives Romulus invited the Sabines to join them in



Romsey borough seal



Romulus, legendary founder of Rome
From a coin.



Romsdal, Norway. Valley of the Rauma, looking towards Snaresfjorden

sacred games, during the progress of which the Sabine women were seized by the Romans. This led to a war with the Sabines, which was ended by the interposition of the women who had been seized, and the Romans and the Sabines agreed to become one nation.

Romulus was king, first with the Sabine Titus Tatius as colleague, and latterly alone. He was taken up to heaven in a fiery chariot by his father Mars, and thereafter worshipped by the Romans as a god under the name Quirinus. See Quirites; Rome.

Romulus Augustulus. Last Roman emperor of the West, A.D. 476. See Augustulus.

Ronald, SIR LANDON (b. 1873). British musician. Born in London, June 7, 1873, his family name being Russell, he studied at the Royal College of Music.

1885-90, appeared on the platform as a pianist, 1890, and conducted light opera on tour. Heated as Melba's accompanist, 1894, and conducted opera at Covent Garden, 1895. He conducted many famous Continental orchestras, 1903-9, and became conductor of the New Symphony (now Royal Albert Hall) Orchestra, 1903. He instituted successful concert series at Birmingham and Blackpool, and in 1910 became principal of the Guildhall School of Music. His compositions include much incidental music for stage productions, e.g. *The Garden of Allah*, 1920, and over 200 songs. In 1922 he was knighted.

Ronald Megaw Prize. Naval prize. It was founded in 1906 in memory of Midshipman Ronald Megaw, who was killed accidentally aboard H.M.S. *Montagu*, Nov. 11, 1904. From the interest upon a sum of £1,000 a presentation sword, books, etc., are given annually to the sub-lieutenant who obtains the highest place during the preceding year in the various examinations for promotion.

Ronalds, SIR FRANCIS (1788-1873). British scientist. Born Feb. 21, 1788, and educated privately, he made a study of electricity. In 1816 he made the first experimental electric telegraph, laying down eight miles of wire at Hammersmith, and transmitting signals by means of synchronised rotating disks. His invention was rejected by the admiralty, and after publishing

details of it in 1823, Ronalds took no further interest in it. In 1843 he was made director of the Meteorological Observatory at Kew, and while there he invented photographic self-recording instruments, which began to be used in 1845. This invention was of great practical importance in all work connected with automatic registration for scientific purposes. His invention of the telegraph was developed by Wheatstone and others, the former of whom acknowledged the debt he owed Ronalds. Knighted in 1871 in recognition of his work as a pioneer in the electric telegraph. Ronalds died Aug. 8, 1873.



Sir Francis Ronalds
British scientist

Ronaldshay. Two islands of the Orkneys, Scotland. North Ronaldshay, the most northerly of the islands, is 3 m. long and 2 m. broad, and the surface is mainly low and flat. At Burrian are the ruins of a castle. The North Ronaldshay Firth, which separates it from Sanday, is dangerous to navigation. Pop. 440.

South Ronaldshay is the most southerly of the Orkney Islands. It is 8 m. long and 4 m. broad, with a low, level surface, and is well cultivated. The island has two old churches and remains of several Picts' Houses. Pop. 2,000. The title of earl of Ronaldshay is borne by the eldest son of the marquess of Zetland.

Ronaldshay, LAWRENCE JOHN LUMLEY DUNDAS, EARL OF (b. 1876). British politician. Born June 11,

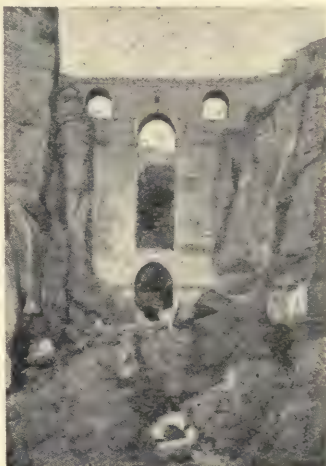


Earl of Ronaldshay,
British politician

where he was aide-de-camp to the viceroy, 1900, Persia, China, Japan, Siberia, and other countries. The results of his observations were embodied in several volumes, including *On the Outskirts of Empire in Asia*, 1904, and *A Wandering Student in the Far East*, 1908. He was Unionist M.P. for Hornsey, 1907-16, and in the latter year was appointed governor of Bengal. His term of office ended in March, 1922.

Roncesvalles OR RONCEVAUX. Village of Spain, in the prov. of Navarre. It lies in the Pyrenees, 5 m. S. of the French frontier and 21 m. N.E. of Pampeluna. It is famous as the scene of the defeat of the rearguard of Charlemagne by Roland (*q.v.*), and there is a remarkable 13th century pilgrimage church containing relics of the paladin. The library of the monastic house in the village has many valuable documents. Pop. 180.

Ronda. Town of Spain, in the prov. of Malaga. It stands on the Guadalevin river, 43 m. W. of Malaga and 44 m. by rly. S.W. of Bobadilla on the Algeciras Rly. It is placed on both sides of a deep, rocky gorge, surrounded by mts. at an alt. of 2,460 ft. The river



Ronda, Spain. Bridge over the rocky gorge of the Guadalevin

is spanned by three bridges. The old town was built by the Moors; the new one was founded by the Catholic kings after the siege of 1485. Besides some Roman and Moorish relics, Ronda has one of the largest and finest bull-rings in Spain. Pop. 22,700.

Rondeau. Development of the early French native songs made for the accompaniment of dancing or household work. It was inaugurated by Guillaume de Machault (1295-1377), and elaborated by the French lyrical poets who followed him. The recurring refrain is its characteristic feature. The rondeau consists of three parts, the first of five lines, the second of three, and the third of five, with the first word, or the first half, of the first line repeated at the end of the second and third parts. The lines are generally octosyllabic and there are but two rhymes. The formula is: aabba; aab, refrain; aabba, refrain. See Poetry; Rhyme.

Rondebosch. Suburb of Cape Town, S. Africa. It is 5 m. to the S. of the city proper and is a residential area. The buildings include the town hall, and here is Grootte Schuur (*q.v.*) See Cape Town.

Rondel. Form of verse. Like the rondeau, it originated in the native French dance-song, and is distinguished by the recurring refrain. It consists of three groups of lines, usually octosyllabic, with but two rhymes. The first group has four lines; the second has four, the last two of which are the first two of the first group; and the third group has six lines, the last two being the first two of the first group. The formula is: ABba, abAB, abbaAB (*see* Rhyme), the capital letters representing the lines which are repeated. The rondel was largely superseded by the rondeau. Andrew Lang and Austin Dobson are successful exponents of this measure, as of many other verse forms from old French sources. See Poetry; Verse.

Rondo. Form of musical composition. In it the principal subject occurs not less than three times and always in the tonic key. Rondos are of two kinds: "old," in which the appearances of the subject are separated by episodes in related keys; "modern," in which the place of the first and third episodes is taken by a second subject treated according to the rules of Sonata form (*q.v.*). The second episode may be retained, or instead of it there may be a development section. The term is often given, loosely, to movements of a light and gay character.

Rønne. Seaport of Denmark, capital of the island of Bornholm (*q.v.*). It stands on the W. coast, and is connected by cable with Møen in Zealand, and by rly. with Naxø on the E. coast. It has a harbour, which has been artificially deepened, and shipbuilding yards, and manufactures pottery from the kaolin found here. Pop. 10,000.

Ronner, HENRIETTE (1821-1909). Dutch painter. Born at Amsterdam, May 31, 1821, the daughter and pupil of Josephus Augustus Knip, she was a member of the Rotterdam Academy, but resided mainly at Brussels.



Her subjects were domestic animals, principally cats, which she painted with much skill and humour. She died in Brussels, March 3, 1909.

Ronsard, PIERRE DE (1524-85). French poet. Born at La Poissonnière, Vendôme, Sept. 11, 1524,



Ronsard

his father was Loys de Ronsard, who held a position in the household of Francois I. Pierre passed a little time at the college of Navarre, in Paris, before he became a page at court. He went to Scotland in the retinue of Mary of Guise, 1538, remaining in that country, and in England, three years. After returning to France he lived in court circles, but devoted much of his time to poetry. Successive kings patronised him, and he was on friendly terms with Elizabeth of England, Mary Queen of Scots, and other royal ladies. About 1572, however, he retired to the country, and Dec. 27, 1585, he died at Tours.

About 1549 Ronsard became leader of La Pléiade (*q.v.*), the object of which, as set forth in Du Bellay's *Deffense et Illustration de la Langue Francoyse*, was to enrich the language of literature and to revolutionise French poetry by the imitation of the masterpieces of classical antiquity. In accordance with this programme, Ronsard wrote Hymnes on the Homeric model, Pindaric odes, and an unfinished epic, *La Franciade*. These experiments, however, have only an historical interest. His real qualities as a poet must be sought in his sonnets and minor lyrics. Unduly depreciated by the classical school, his poetic reputation was championed by the Romantics. See Works, with notes, by P. Blanchemain, 1857-67; Songs and Sonnets of Pierre de Ronsard, C. H.



Henriette Ronner. A Merry Party, one of the Dutch painter's characteristic studies of cats

By courtesy of the Borough of Blackburn

Page, 1903; Literature of the French Renaissance, A. Tilley, 1904; Ronsard and the Pléiade, George Wyndham, 1906; The French Renaissance in England, Sir Sidney Lee, 1910.

Ronsdorf. Town of Germany, in the Prussian Rhine prov. It stands on the Morsbach, about 20 m. E. of Düsseldorf, and has iron and steel works. Pop. 15,000.

Ronssoy. Village of France, in the dept. of Somme. It is 4 m. N.E. of Roisel (*q.v.*). A key position, situated on high ground, it was taken from the British by the Germans in March, 1918, but recaptured by the British 18th div., Sept. 18-19, 1918. There is a war cemetery here. See Somme, Battles of the.

Röntgen, WILHELM KONRAD (1845-1923). German physicist. B. at Lennep, in the Prussian Rhine prov., March 27, 1845, and educated at Zürich University, he became professor successively at Hohenheim, 1875; Strasbourg, 1876; Giessen, 1879; and Würzburg, 1885. In Nov., 1895, he announced the discovery of the rays which bear his name, in 1899 he was appointed professor of experimental physics at Munich, and in 1901 he received the Nobel prize for physics. Röntgen was awarded the Rumford medal of the Royal Society and the Barnard medal of Columbia University for his discovery of the Röntgen or X-rays. He wrote numerous scientific papers on them, as well as on other branches of physics, and carried out valuable research work on the conductivity of heat of crystals,

magnetic rotation of polarised light, absorption of heat of gases, etc. He died on Feb. 10, 1923. See X-Rays. Pron. Runtghen.

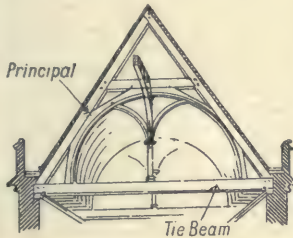
Röntgen Rays. Phenomena which occur when an electric charge passes through a highly rarefied vacuum, e.g. a Crookes tube. In such circumstances emanations pass from the negative electrode or across the vacuum to



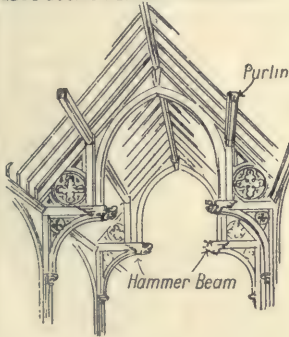
W. K. Röntgen, German physicist

the positive electrode or anode and if these emanations, or so-called cathode rays, strike upon matter, then, in addition to inducing phosphorescence and raising the temperature, they give rise to the production of another kind of rays which differ from the cathode rays and from ordinary light rays in very many particulars. These rays were first found by Professor Röntgen in 1893 and announced in 1895. Many experiments have

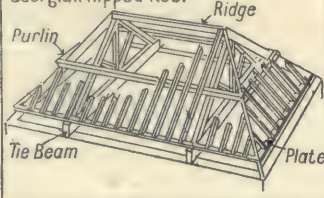
Early Gothic high pitched Roof



Late Gothic Hammer Beam Roof



Georgian Hipped Roof



Roof. Diagrams illustrating types of sloping roof construction

since been conducted with them, and their power of penetrating many kinds of ordinary matter to a differential extent has proved of great value in diagnostic surgery by affording means of taking X-ray photographs or skiagrams. Their nature is, however, not yet completely cleared up, because they do not seem to answer the tests which reconcile other forms of light with the theory of wave motion. See X-Rays.

Rood (A.S. *ród*, cross). Old name for a cross or crucifix. It is specially used for the great crucifix which in English churches, from the 14th century to the reign of Elizabeth, generally stood on the rood-screen dividing the chancel from the nave. At the foot were often figures of the Virgin and St. John the Evangelist. In some churches a gallery, from which parts of the service were recited, ran along the top of the screen. This was called the rood-loft or jubé; and a staircase in the masonry of one of the piers, called the rood-stairs, still seen in many churches, gave access to it. Modern roods occasionally replace those destroyed at the Reformation. See Doom; Holyrood.

Rood. Unit of land or superficial measure, equal to one-fourth of an acre. It is divided into 40 rods, or 1,210 sq. yds. The name is cognate with rod, and probably originally denoted the wand first used in measuring land.

Roof. Part of a building which, being nearest to the sky, protects the interior from sun and rain. In the hot, nearly rainless countries of the East the prevalent type of roof is flat. Where heavy rainfall or snowfall may occur it is sloped, the angle of the slope varying with, and often being characteristic of, the particular style of architecture employed. The average slope of an ancient Greek roof was not more than 16 degrees, that of Roman, Romanesque, and Renaissance styles was some six degrees steeper, while the Gothic pitch sometimes reached as much as 60 degrees.

Among sloping roofs one may note especially the high-pitched "cradle" roof of timber, frequently used for important buildings in the Middle Ages, which was structurally a triangle inscribed by a series of semi-circular arches. To this class of open timber roof belongs, also, the beautiful hammer-beam roof of the Perpendicular period (*q.v.*). The curb roof, of which the Mansard roof and the French roof are varieties, is one in which the line of the slope is bent on two or four sides. The gabled roof is a ridge roof ending in a gable (*q.v.*); the hipped roof, characteristic of Georgian architecture, is one in which the inward slope from wall-plate to ridge is at the same angle on the four sides; an M roof is composed of two parallel ridges separated by a valley or gutter; a lean-to roof is a single slope such as that covering the aisle of a church.

In connexion with roof construction, the chief problem facing the



Rood. Cross above chancel rail in Westminster Cathedral, London

medieval builders was to prevent the downward and outward thrust of the roof from exercising too much pressure on the walls. This they accomplished by the counter-thrust of the flying buttress and by strengthening the framework of the roof itself by a solid tie-beam, extending from wall to wall, and by trusses, at the same time using as light a material as possible for the roof covering. Tiles have been the favourite weathering materials from classic times. Lead and copper have been used in France and Great Britain, and in the U.S.A. the roofs are often protected by tin plates. Roofs of very large span, *e.g.* rly. stations, are commonly constructed of iron or steel and glazed to admit light. Cottages are often roofed with thatch, or with stone or slate in certain districts. See Architecture; Building; Mansard.

Rook (*Corvus frugilegus*). Common bird of the crow family. The plumage is black with purple reflections, and the length of the bird is 18 in. It is readily distinguished from the crow by the bare whitish patch of skin surrounding the base of the beak. It is common in Great Britain, and nests in large colonies in the tops of high trees, preferably near human dwellings.

About March the old nests, which are made of sticks and lined with grass, are repaired or new ones built. Five or six eggs are laid,



Rook. Gregarious bird of the crow family

W. S. Berridge, F.E.S.

bluish green in colour and spotted with brown and purple. The male often shares the duty of incubation with the female. Out of the breeding season the rookery is usually deserted, and the birds roost elsewhere, though in some cases they pay frequent visits to the nesting site. Rooks are very gregarious, and their morning and evening flights to and from the feeding grounds are familiar sights in the country. The food consists mainly of grubs and insects, and in this way the birds more than compensate the farmer for the seed that they consume. *See Eggs, col. plate.*

Rooke, Sir George (1650-1709). English sailor. Going to sea as a lad, he saw much service against the Dutch and gained a good reputation as a seaman, being promoted rear-admiral in 1690. The victory of Barfleur, 1692, was practically due to Rooke's gallantry and seamanship, and he was knighted in 1693. Lord commissioner of the admiralty in 1694, he became commander-in-chief of the Mediterranean fleet in the following year, and in 1697 of the Channel fleet. On the outbreak of the war with France, 1702, Rooke sailed with 14,000 men under the duke of Ormonde, and by a brilliant and daring attack seized Vigo and totally destroyed the Franco-Spanish fleet anchored there. In 1704 he assisted in the capture of Gibraltar, July 21, and the following month fought a determined but indecisive battle off Malaga. He died Jan. 24, 1709.



Sir George Rooke.
English sailor.

Rookwood. Municipality in Cumberland co., New South Wales, Australia. The necropolis, 9 m. by train from Sydney, is on the route to Paramatta. There are meat-preserving works and brick-fields. Pop. 5,450.

Roon, Albrecht Theodor Emil, Count von (1803-79). German soldier. Born April 30, 1803, at Pleushagen, near Kolberg, the son of an officer, he entered the Prussian army in 1821. Very industrious, he made a reputation as a writer by works on military geography, while he taught the cadets. lectured, served on the



Count von Roon.
German soldier

he taught the cadets. lectured, served on the

general staff, and acted as tutor to Prince Frederick Charles, meanwhile rising from rank to rank. In 1848 he saw a little actual warfare, and with the support of King William I began the work of reforming the army. He had a hard



Theodore Roosevelt

struggle, but in 1859 he was made minister of war and in 1861 minister of marine. He held the two posts until 1871, and the fruit of his labours was seen in the wars against Austria and France. In the former war he commanded a division. In 1871 he was made a count and in 1873 a field-marshal. In 1871-72 Roon was president of the Prussian ministry, and he died Feb. 23, 1879. His memoirs were edited by his son, 1892, who also wrote his Life.

Roorkee or **Rurki.** Town of the United Provinces, India, in Saharanpur dist. It is situated in the E. of the dist. and has rly. connexions with Dehra, Saharanpur, and Najibabad. The Thomson Civil Engineering College is the most noted of this type of educational institution in India; the town is the headquarters of the Ganges Canal administration, and contains the canal workshops. It was a mud village before the canal was constructed. Pop. 13,900.

Roosevelt. River of Brazil, formerly known as the Rio Dubida or Doubtful River. It is an affluent of the Madeira, and was explored by the Roosevelt-Rondon Expedition in 1914, and re-named after Theodore Roosevelt. Rising in Matto Grosso state, it flows N. for 930 m. to join the Madeira above Taboral. *See* Through the Brazilian Wilderness, T. Roosevelt, 1914.

Roosevelt, Franklin Delano (b. 1882). American politician. Born Jan. 30, 1882, in New York, he was educated at Harvard and afterwards, in law, at Columbia Univer-

sity. In 1907 he became a barrister, was a member of the senate of New York, 1910-13, and in 1913 joined the Democrat administration as assistant secretary of the navy. He remained at the navy office during the Great War.

Roosevelt, Theodore (1858-1919). American politician, author, and traveller. He was born in New York, Oct. 27, 1858, of an old New York family, and entered politics on his graduation from Harvard. At once he stood out as a champion of good government and, as leader of the Republicans in the New York state assembly, 1882-84, as Federal civil service commissioner, 1889-95, and as New York City police commissioner, 1895-97, he fought corrupt politicians and all who batted on vice. During this period he spent a year on a ranch and established his reputation as a big game hunter.

When the Spanish War began Roosevelt was assistant secretary of the navy. He resigned to become lieutenant-colonel of the Rough Riders regiment he raised, which distinguished itself at San Juan Hill in Cuba. He returned, a popular idol, to be elected governor of New York state, 1899-1900. His term was a miserable period for the bosses of his own party. Characteristically, he never broke with them, but forced them to subservience. They therefore planned to be rid of him by making him vice-president of the United States; but President McKinley was assassinated in Sept., 1901, and the forceful reformer thus unexpectedly succeeded to the office of president.

Reciprocity with Cuba, then an American dependency, was forced on the Old Guard, and in 1902 Roosevelt began his attack on the trusts and "special interests"; railway rebates in favour of big shippers were made illegal and the bureau of corporations was established to control large industrial combines. Foreign affairs felt the same touch. Germany sought to seize a Caribbean Sea port, but the sudden mobilisation of the American navy foiled her; Colombia tried to block the building of the Panama Canal, but a revolution tore from her the territory needed, and cleared the way for the commencement in 1904 of that great engineering work. Americans were proud of their chief executive officer, and re-elected him president in 1904 by an enormous majority over his Democratic opponent.

In the negotiations leading to the end of the Russo-Japanese War (1905), Roosevelt fought strenuously for peace, thus earning in 1906 the Nobel Prize; and two

years later, fearing Japanese designs, he sent the American fleet round the world as a demonstration of force. At home, meanwhile, he continued his war on the immoral alliance of the political machines and great financial interests, and initiated a movement for the conservation of the natural resources of the country. Refusing a third presidential term, he procured the election of William Howard Taft as his successor, and departed in 1909 on a scientific hunting trip in East Africa.

President Taft's policy, however, so dissatisfied Col. Roosevelt that he broke openly with him and formed the Progressive, or Bull Moose party. He ran as its presidential candidate in 1912; he was unsuccessful, but brought about Taft's overwhelming defeat. In 1913 Roosevelt went exploring in Brazil; he discovered the Dubida river, but seriously impaired his health. His four sons went to the front in the Great War, one being killed. He died unexpectedly, Jan. 6, 1919.

Few men filled a larger sphere in their generation than Theodore Roosevelt. His intense Americanism, his marvellous vitality, his supreme self-confidence, his real sympathy for the underdog, made him popular at home and carried his fame abroad. Nevertheless, he showed little conception of the vast social changes on the eve of which he lived. He never tackled the underlying problems of the United States—the tariff, currency reform, or the labour question. But one distinguished service he rendered was to awaken Americans to their true international position. He built up the U.S. navy, and was

the first president to make his country felt all over the world.

As a memorial the house in New York where he was born is to be used as a school of civics. His works include *Hunting Trips of a Ranchman*, 1886; *American Ideals and other Essays*, 1897; *The Rough Riders*, 1899; *African Game Trails*, 1910; *Theodore Roosevelt, an Autobiography*, 1913; and *The Great Adventure*, 1919. See *Theodore Roosevelt, the Man and the Citizen*, J. A. Riis, 1904; *Theodore Roosevelt, the Logic of his Career*, C. G. Washburn, 1916; *Lives*, N. M. Butler, 1919; *W. D. Lewis*, 1919; *W. R. Thayer*, 1919.

L. R. Holme

Root. Lower extremity of the main stem in higher plants. Its beginnings are evident, usually, in the seed, where the embryo has two poles, one ascending and becoming the shoot, the other descending and becoming the primary root. Its functions are two-fold—it anchors the plant in the ground, and absorbs from the soil water in which mineral salts are dissolved.

The growing point is protected from injury in its passage through the soil by a sheath of cells (root-cap) constantly renewed from within. The sensitive root-tip is geotropic and hydrotropic; its general course is straight down, but its hydrotropism may induce it to turn aside to water. The root branches laterally, but the branch roots have a more horizontal orientation with a tendency to grow away from the main or tap root (exotropism). As these lateral branches are produced on all sides of the root and themselves branch, a considerable area of soil may be explored for food by one plant.

If a stone or other obstacle checks the onward growth of a root, the tip works around it and then resumes its former course. The food collection is accomplished by abundant single-celled root-hairs situated near the tip. In many trees and other plants, however, this function is performed by a friendly fungus (*Mycorhiza*), which supplies the plant with the products of decayed organic material. The root increases in thickness in proportion to the growth of the stem.

In many plants the roots become reservoirs for the storage of reserve materials to bridge over the dry season or the cold season, and enable the plant to make a fresh start with full vigour in the wet season or the spring. Man has utilised this tendency by selection and produced the abnormally succulent roots of the carrot, parsnip, turnip, mangold, etc.

Root pruning is a horticultural operation practised upon young trees, usually fruit trees, which have produced a great deal of stem and leaf, but few fruit buds. The young trees should be lifted up cleanly out of the ground and the tap root removed with the pruning knife, or secateur. Heavy gross wood can be cut away freely, but the young shoots should be spared as far as possible. In root-pruning large, established trees, the usual method is to trench all round the tree and then lever it upwards, until the tap root can be cut off and woody laterals shortened. The vacant space thus left at the base of the severed root is filled with good loam and well-rotted manure, the tree is returned to its original position, and the trench filled in.

Root Crops. Before the introduction of the turnip into agriculture, land was allowed to remain in a fallow state, i.e. without a crop, at regular intervals, partly to allow of thorough cleaning. But the invention of drill-

ing by Jethro Tull allowed of tillage between the rows for cleaning purposes, while by growing turnips or an equivalent, not only was the productivity of the land increased, but food provided for living on salted meat obviated. Such a crop is often known as a fallow crop, because it takes the place of the old bare fallow. The term root crop is not only applied to turnips, swedes, mangolds, sugar beets, carrots, and parsnips, where the part harvested is actually



Root. Method of pruning roots of fruit trees. 1. Diagram showing how roots grow. 2. Shortening tap root of young tree. 3. Trench dug round older trees to permit of pruning their roots

a root, but also to potatoes, which are tubers, or thickened underground stems, and to such things as rape, kohlrabi, or field cabbages, which occupy the same place in a rotation. The American term intertillage crop is all-inclusive, and is therefore strictly accurate.

Root crops are also advantageous in giving full employment to labour at times when it would otherwise be slack, and in affording the opportunity for maintaining the fertility of the land by the application of heavy dressings of manure. The work begins as soon as harvest is over, is followed by winter and spring ploughing, and afterwards by the preparation of a seed-bed and the sowing of the crop, during the growth of which singling and intertillage make further demands on labour. See Agriculture; Botany; Crops; Plant.

Root. In philology, that part of a word which remains after it has been stripped of everything formative and accidental. Take the word "examination," from Lat. *examinationem*, accusative of *examinatio*, the verbal noun of *examinare*. *Examin-* is from *exa(g)men*, the scale of a balance (*exigere*, to weigh out), and contains the suffix *-men* (seen in English *acumen*, *regimen*) and the prefix *ex-*, out. Remove these and *-ag-* remains. This is the root, the original idea of which was "driving." Roots have no independent existence, and probably do not constitute the beginnings of language, but are convenient labels under which to classify derivatives. See Philology; Place Names.

Root. In mathematics, a quantity which when multiplied by itself a requisite number of times produces a given expression. Thus the square root of a number is such that when multiplied by itself it gives that number. The values of the unknowns which satisfy an equation are called the roots of the equation.

Root, ELIHU (b. 1845). American statesman. Born at Clinton, New York, Feb. 15, 1845, he



Elihu Root.
American statesman

graduated at Hamilton College in 1864, and was called to the New York bar three years later. U.S. district attorney at New York, 1883-85, he was prominent in the legal and political world. As secretary of war in McKinley's cabinet, 1899-1904, he reorganized the war department and introduced several reforms into the army. Under

Roosevelt, Root was secretary of state, 1905-9, serving as senator from the latter year until 1915. In 1910 he was appointed member of The Hague tribunal, being awarded the Nobel peace prize in 1912. In 1917 he went to Russia at the head of a diplomatic mission.

At different times Root sat on many important commissions and tribunals, including the Alaskan Boundary tribunal, 1903, and The Hague tribunal of arbitration between Britain, France, Spain, and Portugal concerning church property, 1913. Chairman of the Republican convention of 1912, he refused nomination for the presidency. As an international jurist, he had much to do with setting up the permanent Court of Justice under the League of Nations.

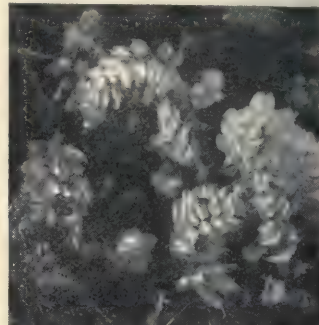
Root and Branch Men. Name applied to those members of the English Parliament who favoured the policy of destroying episcopacy root and branch in 1640-41. A petition to this effect was signed by 15,000 citizens of London and presented to Parliament, Dec. 11, 1640. A bill on these lines was afterwards introduced, but eventually it was dropped. Leading root and branch men were Henry Vane, John Hampden, and Nathaniel Fiennes.

Root Cutter. Implement for slicing roots. Roots are sometimes sliced up as well as cleaned by hand. But it is usual to employ a root cutter if slices or fingers are wanted, and a pulper when shreds are to be prepared, as, more particularly, for sheep and lambs. The well-known Gardner turnip cutter has a horizontally revolving drum, made in two sections, bearing obliquely stepped cutting edges. A modification of this produces slices or fingers at will. The cutting part of a pulper consists of a vertical disk bearing shredding knives.

Rooting or **RODING.** Name of eight parishes of Essex. Situated between Ongar and Dunmow, they are Abbots or Abbess Rooting, Aythorpe Rooting, Beauchamp Rooting, Berners Rooting, High Rooting, Leaden Rooting, Margaret Rooting, which has a Norman church, and White Rooting, which includes the hamlet of Morrell Rooting, an ancient church and a picturesque Tudor house, Colville Hall. The Rootings take their name from the river Roding (*q.v.*).

Root Parasites. Plants which attach themselves to the roots of other plants, from which they absorb water and food. Some of these, like toothwort (*Lathraea*) and broom rape (*Orobancha*), separately described, are total parasites, ob-

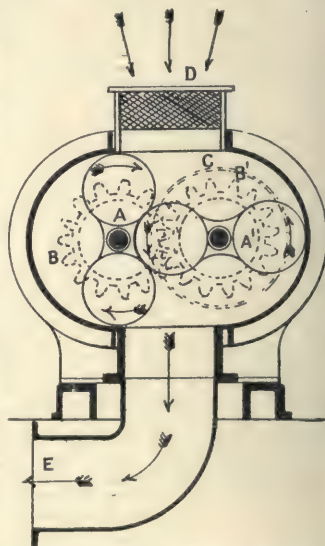
taining the whole of their nourishment in this way, and therefore producing no true leaves. Others,



Root Parasites. Toothwort, *Lathraea squamaria*. a leafless root parasite

like eyebright (*Euphrasia*), rattle (*Rhinanthus* and *Barbisia*), lousewort (*Pedicularis*), and cow-wheat (*Melampyrum*), are partial parasites, obtaining only crude fluid from their hosts and elaborating it in their leaves.

Root's Blower. Machine for providing air blast, or forcing gas or air under pressure through pipes. It was first constructed by P. H. and F. M. Root, of the U.S.A., and introduced into Great Britain about 1860. It takes a place between the fan and the blowing engine (*q.v.*), and will efficiently deliver considerable volumes of air at moderate pressures. It consists of two arms with parallel axles, enclosed in a casing which they fit as closely as practicable and in



Root's Blower. Diagram of the machine. A A', Revolving arms. B B', Driving wheels. C, Driving pulley. D, Air inlet. E, Air outlet

which they revolve, in opposite directions and at equal speed. The casing has an inlet and an outlet for the air. Various forms have been given to the arms. Their essential features are that they make the tightest practicable air joint with the casing, and are themselves always in contact, or just clearing, so as to avoid too much friction. They act as pistons and divide the casing into two compartments, one of which receives air, while in the other the air is compressed and forced out of the casing. The machine is largely used to supply blast to cupolas, and in gas and chemical works.

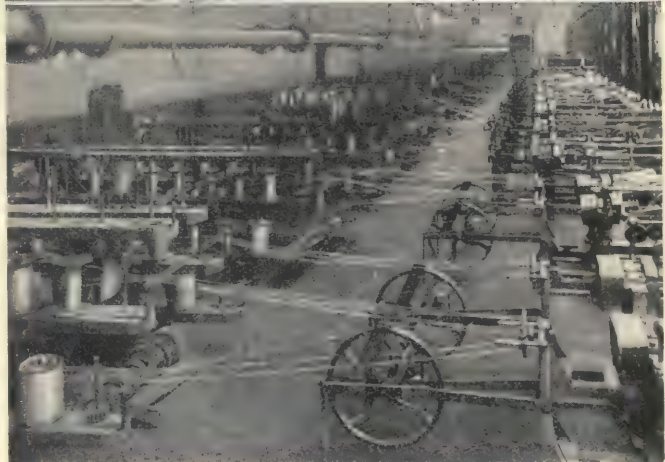
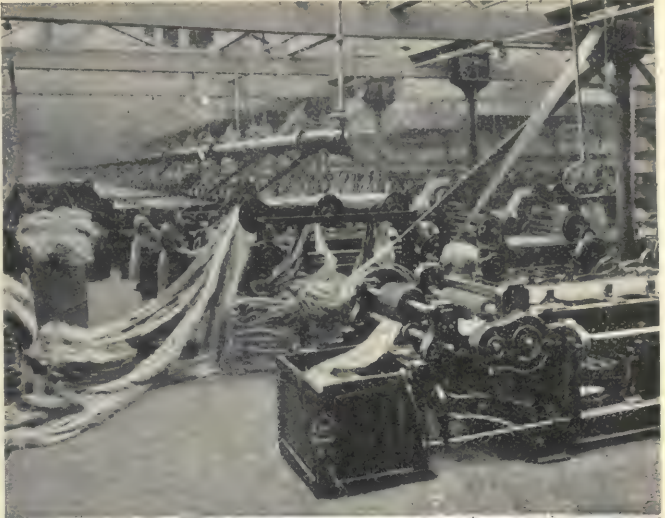
Rope. Cordage of a certain circumference, usually one inch or over. There is, however, no definite standard.

Rope-making is a very old industry. Constant references to it are made by ancient writers, and pictorial diagrams of the industry are found in early Egypt. Until the 19th century, however, ropes were laboriously made by hand, though the first rope-making machine was actually brought out by Cartwright in 1792. In the old hand manufacture of rope, a ropeway, often a quarter of a mile in length, was essential, two workmen working together. One carried a bundle of hemp, or other material, and the other looked after a wheel on which were a series of hooks to which the hemp was fastened. This wheel was turned as the rope spinner walked down the ropeway making his yarn. The latter was afterwards twisted into strands, and the strands into ropes. Three strands twisted together formed what is known as a hawser laid rope, and three hawsers twisted became a cable.

Machinery for Spinning Yarn

In modern rope-making the hemp, jute, coir, or other material used is spun into yarn in a similar way to that in which cotton is spun. The yarns are wound on large bobbins, and for making strands are threaded through holes in a vertical iron plate, passed through a fixed iron tube, and then attached to a hook on the twisting machine. The latter runs on rails laid along the rope-walk, and as it moves the yarn is twisted into strands, several strands at a time being fashioned, according to the number of hooks on the twister.

The strands are fashioned into ropes by the machine, one form of which acts as follows: On the fore end of the machine are a number of hooks which revolve in the same direction, to which are attached the strands. At the other end of the rope-walk is a device known as



Rope. Stages in the manufacture of ropes. Top, preparing the hard fibre: below, twisting the strands to form a rope

By courtesy of the Belfast Ropework Co., Ltd.

the traveller, which has one or two large hooks on it, according to whether one or two ropes are being made. In between the traveller and the fore end, running on the rails of the rope-walk, is the top machine. The strands attached to the fore end are passed through grooves of the conical wooden block of the top, and are then fastened to the hooks of the traveller.

The hooks of the latter and those on the fore end revolve in opposite directions, and as the twisting of the strands takes place the top machine is moved along the rails by the pressure which is caused by the closing strands on the wooden block.

In the making of tarred ropes the yarns are first passed through tanks of heated tar, then through rollers to squeeze out the superfluous tar, and allowed to dry for

a few days before being formed into ropes. In the manufacture of cord for fishing lines and nets, the yarn is passed through hot starch and drying and polishing rollers to impart the necessary polish. Hemp, flax, cotton, manila, sisal, and jute are the chief vegetable fibres used in the manufacture of ropes other than wire ropes. For the manufacture, etc., of the latter, see under Wire Rope. See Spinning.

Roper. River of the Northern Territory, Australia. Formed from the rivers Strangeways and the Chambers, it flows E. to the Gulf of Carpentaria. Navigation is somewhat impeded by the bar at the mouth, but is possible for boats of 12 ft. draught for 90 m. to Leichardt's Bar. Stores for the Overland Telegraph were landed at the Roper, and conveyed by the valley route 200 m. to Bitter Springs.

Roper, MARGARET (1505-44). Eldest daughter of Sir Thomas More (*q.v.*). One of the most learned and at the same time one of the most womanly women of her time, beloved of her father and of all who knew her, she, about 1525, married William Roper (1496-1578), her father's biographer. She is said to have secured her father's head after his execution, and to have preserved it until she herself died. She was buried in Chelsea Church, but the head of Sir Thomas More is believed to have been discovered in June, 1824, in a leaden box in the Roper vault at S. Dunstan's Church, Canterbury. Many of her letters are extant. Her character is reflected in Ann Manning's *The Household of Sir Thomas More*, a work which purports to be a journal kept by Margaret from her 15th year until her father's death.

Ropes, ARTHUR REED (b. 1859). British author. Born at Lewisham, Dec. 23, 1859, he was educated at



Arthur Reed Ropes.
British author
Russell

London schools and King's College, Cambridge, of which he became a fellow. After some years spent in teaching, he turned his attention to writing. His first work for

the stage was a comic opera, *Fadimir*, 1889; then followed a steady succession of musical plays for which, under the pseudonym of Adrian Ross, he supplied the lyrics or the libretti, or both. These included *Morocco Bound*, 1893, *San Toy*, 1899, *The Merry Widow*, 1907, and other popular productions.

Ropes, who when at Cambridge won the chancellor's medal for English verse, published a volume of *Poems*, 1884. He also devoted much time to journalism, and his *Short History of Europe*, 1889, showed him in the rôle of teacher.

Rope Trick. Performance of Indian jugglers. According to the evidence of eye-witnesses, some performers are said to throw a rope up into the air to a great height, from which it hangs to the ground, without any visible support, and a boy climbs up until he disappears from sight, afterwards reappearing. Although many Europeans have seen the trick, it has never been scientifically investigated, and the only hypothesis at all plausible which attempts to account for a seemingly incredible phenomenon is that of collective hallucination.

Ropeway. Wire cable on which a carriage is supported and run on wheels for the purpose of transport. Aerial ropeways are an alternative to railway tracks laid on the ground, and in many situations afford the only reasonably cheap method of transporting goods. Strong wire cables, strung on towers, carry the load in specially designed suspended buckets.

Fig. 1 illustrates a system suitable for moving very heavy individual loads over long, steep

filled, and returned to the other track. The carriers automatically let go the hauling rope when entering a shunt, and grip it again when leaving. The jaws of the grips are actuated by the weight of the bucket; the steeper the incline and the greater the pull, the more tightly do they cling to the rope.

In the fourth system (Fig. 4) one endless rope, travelling continuously in the same direction, supports and moves the carriers, which are either attached rigidly to it or grip it automatically. In the second case the carriers can be shunted at the terminals.

The last two systems are used for long cable-ways designed to carry a rapid succession of moderate loads. If the ropeway has a sufficient gradient, it will work by gravity alone, assuming the loaded carriers to travel downwards. Otherwise power is required to operate it. Very long ropeways are

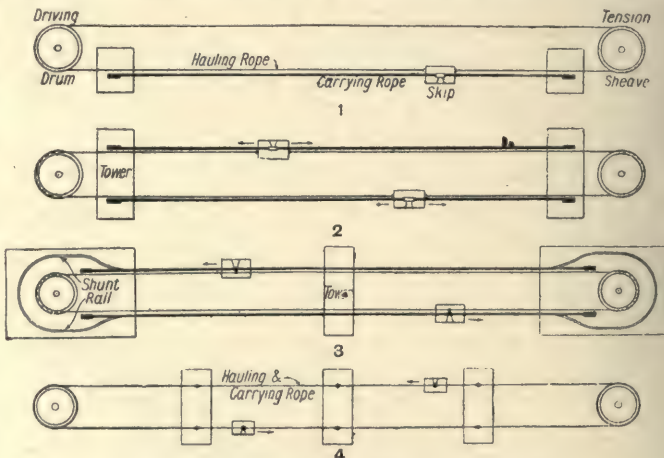


Ropeway employed at a Northumberland colliery, capable of transporting 30 tons per hour, showing net-way over the road

Ropeways, Ltd., London

spans. The load is borne on a single fixed cable, and pulled up or let down by an endless hauling rope of smaller diameter. Fig. 2 shows a duplication of the first system. Here the descending load assists to draw up the ascending load. The third system (Fig. 3) employs two fixed carrying ropes and an endless hauling rope travelling always in the same direction. On reaching the end of the track, the buckets and their carriers are run on to a shunt rail, emptied, or

usually divided into sections that are independent of one another, each provided with winding and tension drums, and the carriers are transferred from one section to the next over short level shunt rails. The longest ropeway yet erected connects Chilecito, in Argentina, with Upalungos, a mining station 22 m. away. The total vertical rise is 12,500 ft. This ropeway works on the third system, is divided into eight sections, and includes spans of 1,770, 1,881, and



Ropeway. Systems of aerial cable transport. See text



Rorke's Drift. The Defence of Rorke's Drift. From the painting by Lady Elizabeth Butler, depicting the heroic stand of the small British garrison against the attack of about 4,000 Zulus, Jan. 22, 1879

By courtesy of the Fine Art Society

2,177 ft. Ropeway cables are kept lubricated by passing through tanks of oil at the stations; or, if fixed, by means of travelling cars which distribute oil automatically.

Roquefort. Village of France, in the dept. of Aveyron. It stands on a height, 1,970 ft., among the limestone Causses, 44 m. N.W. of Béziers. It is famous for its cheeses of sheep and goats' milk, about 9,000 tons of which are produced annually. Roquefort cheese has been considered a delicacy since the days of Pliny. Pop. 1,200.

Rorques, PIERRE AUGUSTE (1857-1920). French soldier. He entered the École Polytechnique in 1875,

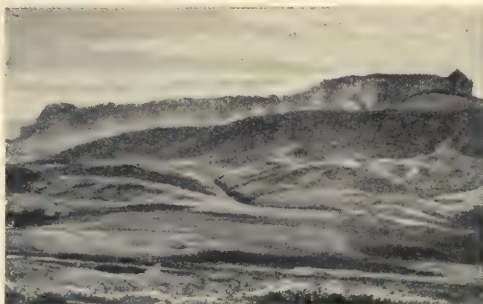


Pierre Rorques.
French soldier

and spent many years on active service in Algeria, Tongking, and Dahomé. From 1897 to 1906 he was engaged in extensive engineering work in Madagascar, then succeeded Joffre in the direction of the Engineers, and in 1909 became director of aeronautics. During the first years of the Great War he held a command in the East, was for a brief period minister of war, and later was in charge of important military missions. He died at Saint Cloud, Feb. 26, 1920.

Roraima. Mountain in the S.E. of Venezuela, on the borders of British Guiana and Brazil. Of tabular form, the upper part rises in precipices from 1,600 ft. to 3,000 ft. alt. There are numerous

waterfalls, some descending nearly 2,000 ft. Of its several peaks the loftiest reaches an elevation of 8,625 ft. Several rivers tributary to the Essequibo, Amazon, and Orinoco flow from it.



Roraima. The table mountain of British Guiana

Rorke, KATE (b. 1866). British actress. Born in London, Feb. 22, 1866, of an old theatrical family, she first appeared at the Court Theatre, London, 1878, and after her performance in T. W. Robertson's School, 1880, became a popular player of comedy parts, being frequently associated with Sir Charles Wyndham. From 1889 she played leading parts with Sir John Hare, and in 1904 appeared in the title rôle of G. B. Shaw's Candida. In 1906 she became professor of dramatic art at the Guildhall School of Music.



Kate Rorke.
British actress

Rorke's Drift. Place on the Tugela river, Natal, S. Africa. It is 23 m. from Dundee and is famous for the stand made by a few British soldiers against a Zulu army, Jan. 22, 1879. After the disaster at

Isandhlwana, the small garrison here was attacked by about 4,000 Zulus. Under Lieuts. Chard and Bromhead, 80 men of the S. Wales Borderers, of whom about one-half were in hospital, beat back repeated attacks of the enemy, who finally withdrew. The British loss was 17 killed and 10 wounded.

Zulu Wars.

Rorqual (*Balaenoptera*). Small genus of toothless whales. In them the teeth of the cachalots and dolphins are replaced by fringed plates of baleen or "whale-bone," for straining off the small fish, crustaceans, and molluscs, upon which they feed. Of these plates there are more than 300 on each side of the upper jaw. Rorquals are of more slender form than some of the whales; the head is small compared with that of the sperm whales, and there is a dorsal fin.

The floor of the mouth and the throat are thrown into longitudinal folds, allowing of considerable distension when feeding. The females exceed the males in size. Four species are found around the British Isles, of which the common

rorqual or finner (*B. musculus*) is from 50 ft. to 70 ft. in length, and feeds largely on herrings. Sibbald's rorqual or blue whale (*B. sibbaldii*) is the largest whale known, a length of 85 ft. being verified, but greater lengths have been reported. The lesser rorqual (*B. rostrata*) attains only about 30 ft.; a common British species, Rudolphi's rorqual (*B. borealis*), about 50 ft. long, is found in the English Channel and occasionally far up the Thames. The blubber yields large quantities of oil, but that of the finner is considered inferior. See Fin-whale; Whale.

Rorschach. Town of Switzerland, in the canton of St. Gall. It stands on the S. shore of Lake Constance, 62 m. by rly. E. of Zürich and 7 m. N.E. of St. Gall. It has excellent bathing facilities. Above it rises the abbey of Mariaberg, built in the 15th century, and now used as a seminary. Lace and muslin are manufactured. Pop. 14,000.

Rosa, CARL AUGUST NICOLAS (1842-89). German operatic impresario. Born at Hamburg, March



Carl Rosa, German operatic impresario

22, 1842, his original name being Rose, he appeared in England as a violinist, 1854, studied music in Leipzig and Paris, and directed concerts at Hamburg, 1863-65.

In 1867 he married the singer Euphrosyne Parepa (1836-74), and toured in America and Britain. In 1875 he formed the Carl Rosa Opera Company (*q.v.*) to play opera in English in London and most provincial centres. Rosa, who actively promoted composition of English operas, died in Paris, April 30, 1889, and his company was continued after his death.

Rosa, MARTINEZ DE LA. Spanish statesman and author, properly known as Martinez de la Rosa (*q.v.*).

Rosa, SALVATOR (1615-73). Italian painter. Born at Arenella, near Naples, June 20, 1615, he studied under his uncle, Paolo Greco, and his brother-in-law, Francesco Francanzano. Adventurous in temperament, he wandered much in the mountains of S. Italy studying the wilder aspects of nature. Finding his way to Rome in 1635, he was commis-



Salvatore Rosa, Italian painter

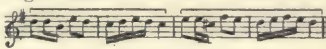
sioned by Cardinal Brancaccio to decorate his palace at Viterbo. In 1639 he was again in Rome, and distinguished himself at the carnival as actor, poet, and singer.

His success encouraged him to further efforts. Involved in Masaniello's revolution at Naples in 1647, he was a wanderer for the next few years, but returned to Rome in 1652. Having roused hostility by his satirical verses, he withdrew to Florence, where he lived nine years, painting and writing poetry. He died in Rome, March 15, 1673. Salvator was one of the founders of romantic landscape. His gloomy mountain and forest scenes, his wild seas and dramatic historical pieces are the reflection of his temperament. One may cite especially his Prometheus (Spada Palace), and his large battle picture in the Louvre.

Rosaceae. Extensive natural order of trees, shrubs, and herbs, natives of various climates throughout the world. The leaves are mostly alternate, and the flowers are of regular shape. The fruit varies greatly; it may be either a fleshy pome (apple and pear), a juicy drupe (plum and cherry), many drupes united (blackberry and raspberry), achenes or nutlets on a fleshy receptacle (strawberry), or on a dry receptacle (silverweed, etc.). About 2,000 species are known.

Rosalba. Signature of the Venetian painter, Rosalba Carriera (*q.v.*).

Rosalia. In music, a kind of sequence (*q.v.*) in which a melody or figure is repeated, each time a degree higher. It derives its name from an Italian folk song, "Rosalia, mia cara," in which the melody begins thus:



Rosalie. Name given by the French soldier to his bayonet.

Rosalind. Character in Shakespeare's *As You Like It*. The daughter of the banished duke, she falls in love with Orlando, youngest son of Sir Roland de Bois, at the match in which he overcomes Charles the wrestler, and is afterwards banished by her uncle, the usurping duke. Disguised as a boy, she travels with Celia, her cousin, and Touchstone the clown, to the forest of Arden, where, having met Orlando, and persuaded him to woo her as if she were his Rosalind, she eventually resumes woman's dress and consents to become his wife. See Anderson, M.; *As You Like It*.

Rosamund or **ROSAMOND**, called the Fair (c. 1140-c. 1176). Mistress of Henry II of England.

A daughter of Walter de Clifford, a knight of the Welsh Border, she was, according to tradition, maintained at Woodstock, where the king had a palace, and was acknowledged by him about 1174. On her death soon after, she was buried in the church of Godstow Nunnery near Oxford. Legend told of a maze or bower built for Rosamund by Henry, to which Queen Eleanor penetrated with the aid of a silken clue, and forced her rival to drink poison. The ruins of the maze in Woodstock park were shown in the 17th century, and Rosamund's well, a rectangular pool or bath, is still to be seen there. She is introduced in Scott's novel, *Woodstock*.

Rosaniline. Basic aniline colouring matter. It occurs in many well-known dyes. Magenta, one of the first red colouring matters obtained from coal-tar, is rosaniline hydrochlorate. When used as dyes for cotton, a mordant of tannin and tartar emetic is necessary. See Magenta.

Rosapenna. Village and pleasure resort of co. Donegal, Ireland. It stands on an opening off the N. coast of the county, and can be reached from Londonderry by car and steamer. In the late 19th century attention was drawn to its beautiful surroundings, and it became popular. There are golf links, and it is a good centre for fishing.

Rosario. River port and city of Argentina, S. America. It stands on a high bluff on the right bank of the Paraná river, 214 m. by river and 175 m. by rly. N.W. of Buenos Aires. Six rly. lines radiate from it over the prov. of Santa Fé, of which it is the capital. Its wharves are reached by ocean and tramp steamers as well as by river vessels, and it is the principal port for the N. provinces. It has numerous grain elevators; wheat, hides, wool, linseed, and other products of the pampas, quebracho, metals, and ores are the main exports.

The city has an electric tramway service and electric lighting in its spacious streets and avenues. The chief industrial establishments are shoe factories, meat-packing establishments, saw-mills, breweries, tanneries, sugar mills, soap, candle, and grease factories, tobacco and cigar factories, foundries, paper and cardboard factories, brick, tile, and cement works. Pop. 230,000.

Rosary (late Lat. *rosarium*, chaplet of roses). Device for assisting in the repetition of prayers. Largely used by Hindus and Moslems, the practice of counting prayers by beads was probably

introduced into Christendom by the Crusaders, though tradition says that a direct revelation for its institution was made to S. Dominic (*q.v.*). The form in com-



Rosary used in the R.C. Church, with five decades and crucifix attached

mon use in the R.C. Church is a string threaded with 50 small beads divided into groups of ten by larger beads. The former represent Ave Marias, the latter Pater Nosters, and at the end of each decade is said the doxology. This series of prayers is itself called a rosary, and many indulgences are attached to the repetition of it. Appended to most rosaries, which are formed in a loop, but not strictly a part, is a string with one large and three small beads, and terminated with a crucifix. The prayers represented by these beads are repeated before the rosary is recited.



Rosario, Argentina. Plaza 25 de Mayo, looking towards the cathedral. Top, right, the law courts

Rosas, JUAN MANUEL (1793–1877). Argentine statesman. Born at Buenos Aires, March 30. 1793. he acquired a cattle run, and to protect himself against the hostile Indians organized an armed force of followers which ultimately gave him great power. He was made governor of the state of Buenos Aires, and in 1835 was chosen dictator of Argentina. He ruled with great cruelty, never sparing his enemies, and by mixing in the affairs of Uruguay he brought about the interference of Britain and France. In 1849 he secured peace with those Powers, but in 1852 a rival, Urquiza, defeated him, and Rosas fled to England, where he passed his concluding years at Southampton, dying March 14, 1877.



Juan Manuel Rosas, Argentine statesman

Roscher, WILHELM (1817–94). German economist. Born at Hanover, Oct. 21, 1817, he studied at Göttingen, where he became professor of political economy in 1843, moving to a similar chair at Leipzig four years later. He wrote largely on his subject, his principal work being *System der Volkswirtschaft* (1854–94), which was widely translated, the first vol. being published in English as *Science of Political Economy Historically Treated*, 1878. Roscher died June 4, 1894.



Roscius (d. 62 B.C.). Roman comic actor, whose full name was Quintus Roscius Gallus. He was born a slave at Solonium near Lanuvium, and reached a perfection in his art that became proverbial. He obtained the favour of the dictator Sulla and enjoyed the friendship of Cicero, who

took lessons from him in his younger days and subsequently defended him in an action.

The name has been applied to many well-known actors, such as Richard Burbage; David Garrick; William Henry Betty, the young Roscius; and Ira Aldridge, an American negro.

Roscoe, SIR HENRY ENFIELD (1833–1915). British chemist and politician. Born in London, Jan. 7, 1833, and educated at University College, London, and at Heidelberg under Bunsen, he was appointed in 1857 professor of chemistry at Owens College, Manchester, which afterwards became the university. With this univer-

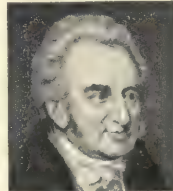


Sir Henry Roscoe, British chemist
Elliott & Fry

sity he was afterwards connected for the rest of his life. He first prepared pure metallic vanadium and conducted other original researches, but he is best known as a teacher of chemistry and an educationist.

Roscoe was a member of the royal commission on technical instruction which resulted in the passing of the Technical Instruction Act in 1889 and the grant of money needed for the new system of education. Roscoe was knighted in 1884 and represented S. Manchester in the House of Commons, 1885–95. His *Elementary Lessons in Chemistry and Treatise on Chemistry*, the latter written in collaboration with Schorlemmer, are the best known chemical works of their kind. He died Dec. 18, 1915. See his *Life and Experiences*, 1906; consult also *Life*, E. Thorpe, 1916.

Roscoe, WILLIAM (1753–1831). English historian. Born at Liverpool, March 8, 1753, he was an attorney by profession and latterly a partner in a Liverpool bank, a connexion which proved financially disastrous. His chief works are his *Life of Lorenzo the Magnificent*, 1796, and *Life and Pontificate of Leo X*, 1805, and a botanical treatise, 1828. His collected Poems were published in 1857. Roscoe died June 30, 1831. See *Life*, 2 vols., H. Roscoe, 1883.



After J. Lonsdale



Roscoff. Town of N.W. France. It is 17½ m. N.W. of Morlaix. The church of Notre-Dame-de-Croaz-Baz, 1550, is noted for its minaret-like tower and spire. The chapel of S. Ninian, now in ruins, was built by Mary Queen of Scots to commemorate her landing here in 1548. The hospital dates from 1573, and among other interesting old houses is the mairie. There is a marine laboratory. About 2½ m. off the coast is the Isle de Batz. Pardons are held in June, July, and Aug.

Roscommon. Inland county of Ireland. In the prov. of Connaught, its area is 990 sq. m. The surface is flat, save in the N., where there are hills rising to over



Roscommon, Ireland. Map of the inland county of Connaught

1,000 ft., and to a lesser extent in the E. The Shannon forms the E. boundary; another boundary river is the Suck, and there are the Arigna and the Boyle. Of many lakes the chief are Ree, Allen, Boderg, and Boffin, expansions of the Shannon, Key, and Gara. The chief occupation is the rearing of sheep, cattle, pigs, etc., but oats and potatoes are grown. Some coal is mined. The plain of Boyle in the N. is famous for its pasture land. The county is served by the M.G.W. Rly. Roscommon is the county town; other places are Boyle, Elphin, Castlereagh, and Strokestown. Until 1833 Elphin was the seat of a bishop. Roscommon was first the name of one of the two districts into which Connaught was divided, the modern county only being established about 1580. Pop. 94,000.



Roscommon, Ireland. Church of the Sacred Heart

Roscommon. Market town and county town of Roscommon, Ireland. It is 18 m. from Athlone and 85 from Dublin, with a station on the M.G.W. Rly. The chief buildings are the Roman Catholic and Protestant churches. There is a trade in cattle and agricultural produce. The town owes its name and origin to S. Coman, who about 700 founded a monastery here. Later a Dominican priory was founded. There are also ruins of a castle, built by the English settlers in the 13th century. Market day, Sat. Pop. 1,900.

Roscrea. Market town of Tipperary, Ireland. It stands on the Little Brosna river, 47 m. from Limerick and 77 from Dublin, with a station on the G.S. and W. Rly. There is a trade in agricultural produce and flour mills. Roscrea owes its name and origin to S. Cronan, who, in the 7th century, founded an abbey here. It was once the seat of a bishop and had two castles built by the English settlers, for its position was a commanding one. There is a round tower, partially intact, and in the fabrics of two churches are remains of two religious houses. Market days, Thurs. and Sat. Pop. 2,200



Roscoff, France. Bellry of the church of Notre-Dame-de-Croaz-Baz



Roscrea. Ruins of the Abbey Church



1. Dog Rose (*Rosa canina*). 2. Moss Rose (*Rosa muscosa*). 3. Red Damask (Gallica). 4. Gruss an Teplitz (H.T.). 5. Pharisaer (H.T.). 6. Marie van Houtte (Tea). 7. Jersey Beauty (Wichuriana). 8. Wm. Allen Richardson (Noisette). 9. Austrian Copper (Austrian Briar). 10. Maréchal Niel (Scented Tea). 11. Excelsa (Wichuriana). 12. Caroline Testout (H.T.). 13. Mme. Edouard Herriot (Daily Mail Rose) (H.T.). 14. Gloire de Dijon (Tea). 15. Mme. Victor Verdier (H.P.).

ROSE : CULTIVATED FORMS PRODUCED FROM THE WILD PARENT STOCK

Specially drawn for Harmsworth's Universal Encyclopedia by J. F. Campbell



16. Mme. Ravery (H.T.). 17. Mrs. Bosanquet (China). 18. Prince de Bulgarie (H.T.). 19. Irish Elegance (H.T.). 20. Frau Karl Druschki (H.P.). 21. Lady Hillingdon (Tea). 22. Lady Ashtown (H.T.). 23. General McArthur (Rugosa). H.P.=Hybrid Perpetual; H.T.=Hybrid Tea (H.T.). 24. Kaiserin Augusta Victoria (H.T.). 25. Melanie Saupert (H.T.). 26. Ophelia (H.T.). 27. Independence Day (H.T.). 28. Hugh Dickson (H.P.). 29. Dorothy Page Roberts (H.T.). 30. Conrad F. Meyer

ROSE: BEAUTIFUL VARIETIES OF THE QUEEN OF FLOWERS

Specially drawn for Harnsworth's Universal Encyclopedia by J. F. Campbell

ROSES: VARIETIES AND CULTURE

H. Havart, Author of *The Back Garden Beautiful*

For further information see the articles Gardening; Grafting; Insects; and those on other flowers and orders of flowers. See also colour plate

The rose (natural order Rosaceae) is the emblematic flower of Britain, whose cultivated forms have been improved from strains or varieties of the wild dog-rose, or briar. It includes numerous hardy and half-hardy trees and shrubs, the vast majority of which are deciduous. Many new species have been introduced from foreign countries, of which the most important are the Damask rose from Syria, 1573; Moss rose and Cabbage rose from Southern Russia, 1595; French rose, 1596; China rose, China, 1759; Banksian rose, China, 1807; Polyantha rose, China, 1822; Japanese rose, Japan, 1845. In addition there are 100 natural species of rose, and the varieties raised by the process of hybridisation are very numerous. The most distinct classes of garden roses are those known as Tea roses, Hybrid perpetuals, and Climbing roses.

Tea roses are among the earliest flowering of roses. The hybrid perpetual class is the most valuable for general garden purposes, and consists of roses which have been cross-fertilised with the object of obtaining as lengthy a period of bloom as possible. Climbing roses have a particularly vigorous stem growth, and are especially suitable for training to cover walls, pergolas, etc.

Standard and Bush Roses

Roses are usually grown in one of two forms—as standards or bushes. A standard rose is primarily a staked native briar of about three ft. in height, known as the stock, to which is united, by the process known as grafting, the scion, or bud, of a highly cultivated rose, which the stock is intended to succour. This form of rose is principally used for specimen or exhibition purposes. The bush rose has a much shorter stock, and is grafted at about planting level. Its chief use is for broad effects in beds and masses, and, as it does not stand so high out of the ground, it requires less protection than the standard. The bush method of cultivation will give a greater number of blooms than the standard, but they may not be of such size or quality.

CULTIVATION. Roses will grow on practically any sort of soil, though a good, rich loam, with clay at the depth of two or three feet, suits them best. The primary essentials for rose culture are a good rich surface soil, either natural or manufactured, below which is a layer of

clay for the purpose of holding moisture, in order to keep the roots of the roses fresh and cool during the dry months of summer, and below that a layer of gravel or other similar drainage material, which will prevent the clay from holding stagnant water for too long a period. The best time of the year for planting roses is from November to March. In country districts, the late autumn period is preferable, but in towns and suburbs it is wise to defer planting operations until the spring. Town soils are usually poorer than those in more favoured districts, and there is danger of loss of plants through frost and fog.

Method of Planting

Roses require to be planted with their roots spread out horizontally, each in a hole about 12 ins. deep. At the bottom of the hole a layer of well-decayed horse manure should be spread, and thinly covered with soil. On no account should the roots of the freshly planted rose tree be allowed actually to touch the manure. This manure is the bait which is to draw those roots downwards and cause them thoroughly to establish themselves. The hole should then be filled up with soil, gently but firmly pressed down, and a top dressing of manure given to keep the surface of the ground warm. In exposed and windy situations, standard roses should have each a stake fixed into the soil and attached to the stem, in order to prevent the wind from swaying the newly planted rose about and so preventing the roots from settling themselves firmly.

The best period of the year at which to prune roses is the spring-time, and the operation, especially in the case of newly planted roses, should be carried out with a secateur or pruning scissors. Standard roses should be pruned more freely than bushes, and all weak, dead, and unripe shoots should be cleared right away. In the case of bush roses, such drastic pruning operations are not necessary. Climbing roses will need little pruning, training, in their case, being more important, as the undesirable shoots die off automatically.

ROSES UNDER GLASS. For out-of-season blooming, roses should be potted up in October, and sheltered from early frosts in a cold frame or house. In January they should be removed to a greenhouse which is

kept just above freezing-point at night and up to a temperature of 45–50° F. by day. Plenty of moisture is essential, and occasional applications of guano, with a gradual increase in temperature. The period of blooming can thus be regulated.

Insect pests to be guarded against are green fly or aphids, and caterpillars. A strong solution of carbonate of ammonia, especially in the greenhouse, is not only an effective remedy, but will also help to stimulate the growth of the roses. Where caterpillars infest, apart from hand-picking, the best remedy for this and all other pests is a mixture of lime, sulphur, and soot, made into a strong solution with soap and water, and liberally sprayed over the infested plants.

The natural colours of roses are white, pink, crimson, and yellow, though hybridisation has produced what are known as florists' varieties to the extent of between three and four thousand. The number is being constantly added to each season, and any attempt to enumerate names here is impossible.

Bibliography. An English Flower Garden, H. A. Bright, 1881; Century Book of Gardening, E. T. Cook, 1900; The Book of the Rose, A. Foster-Melliar, new ed. 1910; A Book About Roses, Dean Hole, new ed. 1911; and the publications of the National Rose Society.

Rose. Heraldic emblem. Both the botanical and a conventionalised type of flower are seen on



Rose in heraldry

shields. The latter are composed of four to six heart-shaped petals, with curved-in tips, golden seed centres, usually small green leaves between the petals (seeded and barbed). In cadency, it is the mark of the seventh son and his house. The rose is prominent in English heraldry, the white flower having been adopted as the badge of the House of York, and the red by the House of Lancaster. The two were united by Henry VII, who introduced the Tudor rose, first borne quarterly, red and white; then dimidiated red and white; and finally a red rose within a white one.

Rose, JOHN HOLLAND (b. 1855). British historian. Born at Bedford, he was educated at Owens College, Manchester, and at Christ's College, Cambridge, of which he was elected fellow in 1914. Reader in Modern History at Cambridge University, 1911–19, he was appointed the

first holder of the Vere Harmsworth chair of Naval History there in 1919. A leading authority on the history of the Napoleonic period, his chief works include *The Rise of Democracy, 1897*; *Life of Napoleon I, 1902*; *William Pitt and the National Revival, 1911*; *Nationality as a Factor in Modern History, 1916*; and contributions to *The Cambridge Modern History*. To this *Encyclopedia* he contributes the article on Napoleon. See *Port. Gallery of Contributors*.

Rose, WILLIAM KINNAIRD (1845–1919). British journalist. Of Ayrshire origin, he joined the staff of *The Scotsman* in early life, and in the Russo-Turkish War represented that journal. He took part in many subsequent campaigns, and in the Greco-Turkish War his vivid account of the retreat from Larissa was rightly accepted as a journalistic classic. Although a member of the Scottish bar he never practised, except as junior in the Ardlamont murder trial, all his energies being devoted to journalism, including seven years as editor of *The Brisbane Courier*. In his later years he was a member of the press gallery in the House of Commons, and a contributor to this work. He died Nov., 1919.

Rose and the Ring, THE. Burlesque fairy story by W. M. Thackeray, first published in 1855. Written and illustrated for the amusement of children, the story is the most successful of the great novelist's short Christmas books. In it he was at his happiest both as a master of literary burlesque and as comic draughtsman.

Rose Apple (*Eugenia jambos*). Evergreen tree of the natural order Myrtaceae. A native of Malaya, it attains a height of 20–30 ft., and has oval or lance-shaped, stalked leaves. The four-petalled white flowers are borne on short leafy shoots in clusters of three or five, and are succeeded by more or less oval red fruits, about an inch across, containing one or two poisonous



seeds embedded in rose-scented edible pulp. An allied species, known as the Malay Apple (*Eugenia malaccensis*), with red or pink flowers, has more fleshy fruit. A native of Malaya, it has become naturalised in the West Indies.

Rosebery, EARL OF. Scottish title borne by the family of Primrose since 1703. Archibald Primrose (d. 1679), a baronet, became a lord of session, and lord clerk register. His son, Archibald (1664–1723), a supporter of the union of England and Scotland, was made an earl in 1703. The title passed to his descendants, and Archibald John, the 4th earl, was made a peer of the United Kingdom in 1828. His son and heir, Lord Dalmeny, a Whig M.P., predeceased his father, so when the latter died in 1868 his successor was his grandson. Dalmeny, near Edinburgh, has been the property of the Primroses for 300 years. See Dalmeny; Mentmore.

Rosebery, ARCHIBALD PHILIP PRIMROSE, 5TH EARL OF (b. 1847). British statesman. Born in London, May 7, 1847, he was the son of Archibald, Lord Dalmeny (1809–51), by his marriage with Catherine (d. 1901), daughter of the 4th Earl Stanhope, who became duchess of Cleveland. He was thus related to Lady Hester Stanhope, the niece of Pitt. Educated at a school at Brighton, Eton, and Christ Church, Oxford, he left Oxford in 1868 without a degree, and in the same year succeeded his grandfather as earl.

In 1871 the earl attracted attention by thoughtful speeches. A wealthy marriage and the friend-

ship of Gladstone added to his importance in political circles, and in 1881 he took office as under-secretary to the home office. He resigned in 1883, but in 1884 entered the Cabinet as first commissioner of works, becoming in 1885 lord privy seal. Adhering to Gladstone when Home Rule was introduced, he became foreign secretary in 1886, but the speedy fall of the ministry placed him and his colleagues in opposition. In 1892 he returned to the foreign office, and in 1894, on Gladstone's retirement, he became prime minister.

A small majority in the Commons and a leader in the Lords were sufficient to impair the stability of the Rosebery ministry, but there were further reasons for its weakness. Its leading men did not work together harmoniously, and the character and policy of Rosebery, his sympathy with the ideas summed up as imperialism, and his ownership of racehorses, made him suspect to many Liberals. The upshot was the resignation of the ministry in June, 1895. Rosebery retained the leadership of the party until 1896, when he formally resigned.

Rosebery never returned to regular political life, although there were occasions when it seemed as if he would. One such was after he had made a notable speech at Chesterfield in 1901, and another was in 1905, when, after some tentative advances on both sides, he definitely declined to accept Sir H. Campbell-Bannerman's programme. To support the conclusion of the S. African War he placed himself at the head of the imperialistic section of the Liberal party, and later he came out in opposition to the fiscal proposals of Chamberlain. He denounced the Budget of 1909, but his public appearances became fewer until he almost sank out of sight. When he did speak, however, he was heard and read with great eagerness, and on occasions his support of a line of foreign policy was of the highest value. In 1889 he became the first chairman of the London County Council, a position in which his gifts were seen at their best. He resigned in 1890.

Rosebery attained eminence as a man of letters. His speeches on literary and kindred subjects were felicitous in phrase and full of thought, while his books show a wide historical knowledge, insight, judgement, and power. The chief are the monograph on Pitt; Sir Robert Peel, 1899; *Napoleon, the Last Phase, 1904*; *Lord Randolph Churchill, 1906*; and *Chatham, 1910*. His *Miscellanies, Literary and Historical*, appeared in 1921.



Rose Apple. Leaves, bud, and flowers. Inset, fruit

His oratory, too, was full of charm and spontaneity, and as a phrase-maker he was unrivalled.

More than most men, Rosebery was fortune's favourite, yet as a politician he failed. Probably he was too candid in speech, too impartial in outlook, his judgement too cool, and his reading too wide to make a partisan, but his failure must be attributed also to a certain lack of perseverance, to that desire for the palm without the dust, of which his Eton tutor spoke. He won the Derby three times, in 1894, 1895, and 1905. In 1892 he was made a knight of the Garter. Lord Rosebery, who in 1911 was created earl of Midlothian, married in 1878 Hannah (d. 1890), daughter of Baron Meyer de Rothschild. She brought him Mentmore, but he preferred as a residence his Epsom house, The Durdans. Their elder son, Lord Dalmely (b. 1882), a soldier and a cricketer, was Liberal M.P. for Midlothian, 1906-10. Neil Primrose (q.v.) was the younger son. The elder daughter Sybil wrote books and married Charles Grant. The younger, Margaret, married the marquess of Crewe. *See* Lives, T. F. G. Coates, 1900; Jane T. Stoddart, 1900; S. H. Jeyes, 1906; Lord Rosebery, Imperialist. J. A. Hammerton, 1901.

Rose Chafer OR **ROSE BEETLE** (*Celonia aurata*). Species of beetle, common in the S. counties of England. In colour it is greenish gold on the upper parts and bright copper beneath. The grub-like larvae are found among vegetable refuse and decaying wood, while the adult feeds upon flowers and is often a nuisance in the rose garden.



Rose Chafer or Rose Beetle, actual size

Rosecrans, WILLIAM STARKE (1819-98). American soldier. He was born at Kingston, Ohio, Sept. 6, 1819, and educated at the military academy of West Point, subsequently returning to a post on the teaching staff there. He resigned from the army in 1854, but rejoined on the outbreak of the Civil War, and had a successful career in various commands until



W. S. Rosecrans, American soldier
After Chappelin

he was defeated by Bragg, the Confederate general, at Chickamauga in 1863. This defeat led to his being relieved of his command, but subsequent criticism has been inclined to vindicate his reputation as a soldier. He died March 11, 1898.

Rose-Mallow (*Hibiscus*). Extensive genus of herbs, shrubs, and trees of the natural order Malvaceae, natives of tropical and temperate regions. Most of the species have showy flowers of various colours, with a double calyx. The name properly belongs to *Hibiscus syriacus*, *H. rosa-sinensis*, and *H. roseus*. *H. syriacus* is a shrub, a native of Syria, whence it was introduced to European gardens in the 16th century. *H. rosa-sinensis* is also shrubby, from China and Japan. It is known as shoe-flower, from a Javanese use of its petals for staining shoe-leather black. *H. roseus* is a N. American perennial herb, with flowers four inches across. Cuba-bast, formerly much used in gardens, was obtained from the inner bark of *H. elatus*, a West Indian tree.

Rosemary (Lat. *ros marinus*, sea dew). Hardy evergreen shrub (*Rosmarinus officinalis*) with fragrant leaves, of the natural order Labiatae. It is a native of S. Europe, whence it was introduced into Britain in 1548. It attains a height of about three ft., and has purple flowers. It is raised from seed sown out of doors in pots, and transplanted into the open ground at a distance of three ft. between the plants. The leaves yield a valuable oil, one of the chief constituents of eau de Cologne. One cwt. of leaves yields over 20 oz. of oil.

Rosemary. Sentimental comedy of early Victorian times. It was written by Louis N. Parker and Murray Carson, and produced May 16, 1896, at the Criterion Theatre, London, where it ran for 153 performances. Sir Jasper Thorndyke, a middle-aged baronet, befriends William Westwood, a young ensign, and Dorothy Cruickshank, with whom he has eloped. Charles Wyndham, Mary Moore, Kenneth Douglas, and James Welch played the lead ing parts.

Roseneath. Village of Dumbartonshire, Scotland. It stands on the S.W. side of Gareloch, 2½ m. from Helensburgh. Near the village is Rose-

neath Castle, a seat of the duke of Argyll. In the Italian style, it was built about 1800, near the ruins of an older building, long the property of the Campbells. Roseneath is mentioned in Scott's *Heart of Midlothian*. Pop. 1,800.



Rose-Mallow. Flower and leaves of *Hibiscus rosa-sinensis*

Rosenheim. Town of Germany, in Bavaria. It stands at the confluence of the Inn and the Mangfall, 40 m. S.E. of Munich. It is noted for its sulphur baths, and



Rosemary. Flowering spike and inset, aromatic leaves

there are extensive salt works, which produce annually about 200,000 cwt. of salt. The town was known in the 10th century and became part of Bavaria in 1247. Pop. 16,000.



Rosenheim, Germany. Street of the Holy Ghost and typical Bavarian church towers

Rosenthal, MORIZ (b. 1862). Galician pianist. Born at Lemberg, Dec. 19, 1862, he studied there and



Moriz Rosenthal,
Galician pianist.

in Vienna, where he made his first concert appearance in 1876. He studied also under Liszt, 1876-78, appeared in Paris and St. Petersburg, 1878, and retired from public playing, 1878-84, in order to study classics and philosophy. His superb technique and great interpretative powers made him one of the foremost pianists of the day, and he toured widely in Britain, Europe, and the U.S.A.

Rose of Jericho (*Anastatica hierochuntina*). Annual herb of the natural order Cruciferae. A native of Syria and N. Africa, it has somewhat oval leaves and small white, four-petalled flowers. After flowering, the leaves fall off, and the stalks curve towards the centre of the plant, forming a lattice sphere, in which form the plant dies and dries, gets blown out of the ground, and bows along before the wind. On coming, perhaps many months later, into moist surroundings, all the parts straighten out—the so-called rose expands, and the seed-pouches open and disperse their contents.

Rose of Sharon. Name of an unknown flower, perhaps the autumn crocus, or a narcissus, mentioned in The Song of Solomon, ii, 1. The name is popularly given to *Hibiscus syriacus*, an ornamental shrub related to the mallows, and to *Hypericum calycinum*, the large St. John's wort (q.v.).

Roses, WARS OF THE. Contest between the rival houses of Lancaster and York for the crown of England, in the 15th century. It is so called because the Lancastrians assumed the red rose and the Yorkists the white as their badges. In 1447 Henry VI, by the death of his uncle, Humphrey, duke of Gloucester, became the sole legitimate representative of the house of Lancaster. The heir presumptive to Henry was Richard, duke of York, who through his mother, Anne Mortimer, represented Lionel, duke of Clarence, the second son of Edward III. Strictly speaking, if the Mortimer line be regarded as being in the royal succession, he was the rightful heir, but the house of Lancaster had been placed in a privileged position in 1399.

King Henry VI periodically became insane. Richard, as next

prince of the blood, claimed a leading place in the Council, and the foremost place when the king was incapacitated. Hence there was a continual struggle between Richard and his partisans on the one side and the queen and the Beauforts on the other. In Oct., 1453, an heir was born to Henry, and Richard's expectation of one day succeeding naturally to the throne was dashed.

Still there was no open collision until 1455, when York, realizing that he was in danger of being tainted for treason, took up arms in self-defence, and the first battle of St. Albans began the Wars of the Roses in May. York was victorious, and his ascendancy was temporarily secured. There was a superficial reconciliation, till again in 1459 he was driven to take up arms, but his followers were scattered, and he and his principal supporters, Salisbury and Warwick, had to fly the country. In the summer of 1460 they reappeared in arms. The king was defeated and taken prisoner at Northampton,



Rose of Jericho, showing, left, the curved-in stalks of the dead plant, and, right, the plant expanded for the dispersal of the seeds

July 10, and York, proceeding to London, startled his supporters by asserting that he himself was the rightful king, and that the reigning house were usurpers. Both he and Henry, however, were persuaded to adopt a compromise, recognizing Henry as king for life, but Richard, instead of the prince of Wales, as heir to the throne.

The queen, however, resolved to fight for her son's rights. On Dec. 30 York was defeated and killed at Wakefield. His son Edward defeated a Lancastrian force at Mortimer's Cross, Feb. 2, 1461, marched to London, and, supported now by Warwick, proclaimed himself king. On March 29, at Towton, Edward and Warwick shattered the Lancastrian forces; Henry and his queen both fled out of England. A Lancastrian rising was suppressed in 1464 by the battles of Hedgeley Moor and Hexham. But in 1469 Edward had completely alienated Warwick, the

man to whom he really owed his throne. In 1470 a revolt was raised which Warwick had fostered. The insurgents were defeated in the fight called the Battle of Lose-Coat Field, and Warwick fled to France, where he became reconciled to Queen Margaret. Henry had been caught and imprisoned in the Tower some time before. In September Warwick returned to England in arms. Edward was taken by surprise and was forced in his turn to fly the country; Henry was once more taken out of the Tower and proclaimed king.

End and Results of the Contest

But on March 14, 1471, Edward was back in Yorkshire; on April 14 he defeated and killed Warwick at Barnet; and on May 4, at Tewkesbury, shattered a second Lancastrian force, headed by Queen Margaret, killed the young Prince Edward, captured the queen, and then a few days later killed the unlucky Henry VI. The House of York was now firmly established on the throne, the only representative of the Lancastrians being Henry Tudor, earl of Richmond, son of Margaret Beaufort. Nevertheless the tyrannical government of Richard III (1483-85) gave the Lancastrians one more opportunity. In 1485, Richmond, who had been in exile, landed in England. Richard was killed at the battle of Bosworth, on Aug. 22, Henry Tudor was proclaimed king, and by his marriage in Jan., 1486, to Elizabeth, daughter of Edward IV, united the houses of Lancaster and York, thereby ending the contest.

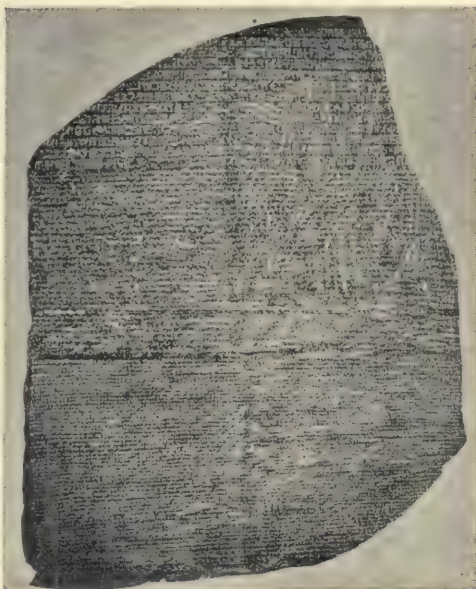
The whole struggle had been one in which no principles were at stake, a war entirely dominated by the personal and family interests of the great nobles. To the people at large the victory of Yorkists or Lancastrians was a matter of indifference, and they took as little part in the contest as they could. But in the course of it the old noble families were nearly exterminated. Estates were forfeited and redistributed; on the ruins of the old system new fortunes were founded by a large number of small men instead of a small number of big men, and after the Wars of the Roses there was never again a danger that the crown would be held at the mercy of a new Warwick the Kingmaker. See England: History; Lancaster; York; consult also The Wars of York and Lancaster, E. Thompson, 1892; The Houses of Lancaster and York, J. Gairdner, 9th ed. 1896; The Strife of the Roses and Days of the Tudors in the West, W. H. H. Rogers, 1900.

A. D. Innes

Rosetta. Town in Egypt, on the Bolbitinic arm of the Nile Delta. Once an important harbour, it is now, owing to the rise of Alexandria as a seaport, unimportant. (Pop. 16,800.)

Rosetta Stone. Inscribed black basalt slab from Rosetta, lower Egypt. It was discovered by one of Napoleon's officers in 1799, and, acquired by Great Britain at the capitulation of Alexandria, 1801, it reached the British Museum in 1802. Bearing an inscription in three versions, hieroglyphic, demotic, and Greek, the Greek was translated by Weston, and the demotic partly deciphered by Akerblad, 1802. Thomas Young identified the hieroglyphic name Ptolemy, 1818; Champollion, by completing the decipherment, through modern Coptic, furnished the long-sought key to hieroglyphic writing. Hieroglyphs missing from the fractured top were recovered from a Damanhur slab found in 1898, now at Cairo. The text records the priestly decree of Memphis, 196 B.C., in honour of Ptolemy V Epiphanes. See Hieroglyphs.

Rosetti, CONSTANTIN (1816-85). Rumanian poet and statesman. A native of Bukarest, he married in



Rosetta Stone. Inscribed slab of black basalt, that furnished the key to hieroglyphic writing

1845 Marie Grant, an Englishwoman, born in Guernsey. He published in 1840 a volume of translations from Byron, Voltaire, and Lamartine. During a ten years' exile in Paris, after the revolution of 1848, he devoted himself mainly to propaganda for the Rumanian revolution. In 1861 he returned to Bukarest, and became president of the Chamber in 1876. He died April 20, 1885.

Rosewater. Water tintured with the essence of roses obtained by distillation. A rosewater dish is a bowl designed to hold rosewater which can be sprinkled over the hands. They are frequently used in the East after eating, and occasionally in Western countries replace the customary finger-bowl. Several examples belong to the Clothworkers' Company, including one presented by Samuel Pepys (q.v.).

Rose Window.

In architecture, a circular window divided into a number of compartments by tracery. Large windows of this type are a feature of the fronts of the great cathedrals; they are generally filled with

stained glass. When the tracery radiates in a more or less definite pattern from the centre, the window is often called a catherine wheel window. See Architecture; Cathedral; York.

Rosewood. Commercial term applied to the dark coloured timber of many distinct species of trees. The American product is from *Dalbergia nigra*, and species of *Machaerium*. Burmese rosewood is *Pterocarpus indicus*; Canary rosewood is the striped wood of a shrub (*Convolvulus scoparius*); Dominica rosewood is *Cordia gerascanthus*; Indian rosewood, *Dalbergia latifolia* and *D. sissooides*; Jamaica rosewood, *Amyris toxifera*; Moulmein rosewood, *Milletia speciosa*; New South Wales rosewood, *Trichilia glandulosa* and *Disozylon fraserianum*; Queensland rosewood, *Acacia glaucescens*. It is much used in the making of furniture.

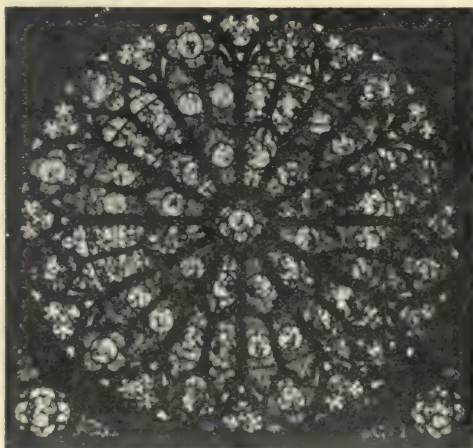
Rosherville Gardens. Once popular London pleasure resort. Formed in a chalk quarry, between Northfleet and Gravesend, on the S. bank of the Thames, and opened in 1837, the attractions included a theatre, dancing platform, a lookout tower with windows of coloured



Rosewater dish and ewer, presented to the Clothworkers' Company by Samuel Pepys, Master, 1677-78

glass, and restaurant. Advertising made the gardens familiar as "the place to spend a happy day," but their popularity waned when the steamboats ceased to run. The gardens were named after Jeremiah Roshier, by whom they were established; and were sold to an oil company, 1920.

Rosicrucians (Lat. *ros*, dew; or *rosa*, rose; *cruz*, cross). Name given to a secret brotherhood, of which much has been written, but little is known. It did not attract wide attention in Europe until the early part of the 17th century, when it arose in Germany, and spread thence to France, and, through the agency in particular of Robert



Rose Window. Stained glass window, nearly 41 ft. in diameter, formerly in the façade of Reims Cathedral. It was destroyed during the Great War

Fludd (*q.v.*), to England. The keystone of the Rosierucian arch is an idealised form of alchemical philosophy. The sign of the order was a rosy cross, and its name is derived by some authorities from dew (*ros*), regarded as a solvent of gold, and identified with light because the figure of a cross (*crux*) contains, in various presentations, the three capital letters of the word *lux*=light, or knowledge.

Rosierucianism, in one form or another, still exists. The Societas Rosieruciana in Anglia has headquarters in London and has published Transactions. France has its Ordre de la Rose-Croix and other bodies claiming knowledge of Hermetic mysteries. The doctrines of the Rosierucians, who were pledged to heal the sick without fee or reward, appear to have included the thesis that fire is the universal means of analysis; that the kingdoms of grace and nature are governed by the same divine laws; that the world is a great musical instrument, and the "harmony of the spheres" a true thing.

Astrology, magic, and demonology were vaguely taught, and it is said that the initiated claimed the power of seeing and communicating with elementary beings, "children of the elements," invisible to grosser eyes, as well as the possession of the *elixir vitae*. To them, or to ideas associated with

Masson, vol. xiii) suggested that the foundation of Rosierucianism was laid in a romance by a German theologian, John Valentine Andrea (1586-1654). See Freemasonry: Mystery.

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Roslin, Scotland. Ruins of the castle. Top, right. interior of the chapel, looking east

ed., 1907; Real History of the R., A. E. Waite, 1887; Catalogue Raisonné of Works on the Occult Sciences, F. Leigh Gardner, with Intro. by W. Wynn Westcott, 1903; The Arcane Schools, J. Yarker, 1909; History of the R. Order in America, H. S. Lewis, 1915.

Roskilde. Seaport of Denmark, on the island of Zealand. It stands at the head of Roskilde Fiord, 20 m. by rly. W. of Copenhagen, a junction on the line to Korsør. It has a splendid cathedral, founded in 1074, and rebuilt in the 12th century, containing the tombs of many of the Danish monarchs. Until devastated by plague and fire, it was the most important town of Denmark, and the capital



them, are attributed Shakespeare's Ariel, the machinery of Pope's Rape of the Lock, Fouqué's Undine, Lytton's Zanoni and A Strange Story, and Scott's White Lady of Avenel. De Quincey (Works, ed.



Roskilde, Denmark. The cathedral, from the head of the fiord. Top, left, interior of chancel, with high altar

Flax and hemp are cultivated in the district. Pop. 28,000.

Roslin OR **ROSSLYN.** Village of Midlothian, Scotland. It stands on the N. Esk, 6 m. S. of Edinburgh, with a station on the N.B. Rly. It has a castle built on the site of a seat of the Sinclair family. The chapel is celebrated for its elegant carvings, especially the beautiful prentice pillar. It was built in the 15th century and was the burial place of the lords. Roslin was made a burgh in 1456, but later its importance declined. There are some small manufactures. The place gives the title of earl to the family of St. Clair-Erskine. In 1303 there was fighting between the English and the Scots on Roslin Moor. Pop. 1,800. See Rosslyn, Earl of.

Rosmead, HERCULES GEORGE ROBERT ROBINSON, 1ST BARON (1824-97). British administrator. Born Dec. 19, 1824, he entered the civil service in Ireland in 1846, after a brief army career, and eight years later became president of Montserrat. Governor of Hong Kong, 1859-65, and of Ceylon, 1865-72, in



1st Baron Rosmead, British administrator Elliott & Fry

the latter year he was appointed to New South Wales, whence, in 1879, he was transferred to New Zealand, and to Cape Colony in 1881. There he found himself faced with native and Boer difficulties which came to a crisis in 1884. Retiring in 1889, he was reappointed to South Africa in the difficult times of 1895. Created a peer in 1896, he retired early in 1897, and died Oct. 28 of the same year.

Rosmini-Serbati. ANTONIO (1797-1855). Italian philosopher and theologian. Born at Rovereto. March 25, 1797, he studied at Pavia and Padua, became a priest in 1821, and in 1828 founded the Institute of the Brethren of Charity, an order more generally known as Rosminians. The English centre is S. Etheldreda's, Ely Place, London. For his philosophical views Rosmini was attacked by the Jesuits, for his advanced political and social ideas by the Austrians. Against empiricism and sensualism he propounded a system of idealism, issuing from the thinking self (psychologism). The knowledge of the real is conditioned by the ideas. He died July 1, 1855. His numerous works include *A New Essay on the Origin of Ideas*, 1830, Eng. trans., 3 vols., 1883-84; and *Psychology*, 1846-48, Eng. trans., 3 vols., 1884-88.



A. Rosmini-Serbati, Italian philosopher

Ross. Market town and urban dist. of Herefordshire, England. It stands on the Wye, 12 m. from Hereford, with a station on the G.W. Rly. The chief buildings are the church of S. Mary the Virgin, a fine old building in the



Decorated and Perpendicular styles, and the picturesque market house. The man of Ross, John Kyrle (q.v.), is buried in the church, near which is Prospect Walk. The town has manufactures of agricultural implements, boots, and flour, and annual fairs are held. Market day, Thurs. Pop. 4,700.

Ross. Famous Scottish earldom. It came into existence when a certain Malcolm was made earl of the district now represented by Ross-shire by King Malcolm IV about 1164. It passed from one lord to another until about 1430, when James I gave it to Alexander

Macdonald, lord of the isles. In 1476 the Macdonalds lost it, and in 1481 it was given to James, a younger son of James III. He was made duke of Ross, but after his time the title died out.

Ross, ADRIAN (b. 1859). Pen-name, for his theatrical writings, of Arthur Reed Ropes (q.v.).

Ross, SIR HEW DALRYMPLE (1779-1868). British soldier. Born July 8, 1779, he was educated at the royal military academy, Woolwich, and entered the R.H.A. in 1795. In 1809 he went to Spain, taking part also in the Waterloo campaign, after which he held important commands at home until he retired in 1858. He died Dec. 10, 1868.



Sir Hew Ross, British soldier

Ross, SIR JAMES CLARK (1800-62). British explorer. Born in London, April 15, 1800, he went to sea at the age of 12 and served in the Arctic expeditions of W. E. Parry (q.v.), 1821-27. Member of Booth's expedition of 1829-33, he discovered the magnetic pole in



Sir James Ross, British explorer

1831. In 1839 he was given command of an Antarctic expedition with the Erebus and Terror vessels, discovering Victoria Land and Mt. Erebus, and reporting that the South Pole was unattainable. Knighted on his return, 1843, he published *A Voyage of Discovery in the Southern and Antarctic Seas*, 1847. He died April 3, 1862.

Ross, SIR JOHN (1777-1856). British explorer. Born June 24, 1777, he entered the navy when a



Ross, Herefordshire. Parish church of S. Mary the Virgin

boy. In command of the *Isabella*, he was sent in 1818 to discover the north-west passage, but after passing Baffin Bay he returned. In 1829 he commanded the *Victory*, a paddle steamer, on a similar voyage. After three years spent in the ice amid great hardships, he was picked up by a whaler and returned home. Ross was knighted for his services, and in 1851 was promoted rear-admiral, having taken part in a search for Franklin in the previous year. He died Aug. 30, 1856. He wrote the *Narrative of a Second Voyage in Search of a North-West Passage*, 1835.



John Ropes.

Ross, MARTIN. Pseudonym of Violet Florence Martin (d. 1915), Irish novelist. Educated at Alexandra College,



Martin Ross, Irish novelist

Dublin, she spent her early years at Ross, co. Galway, which place provided her pen-name in her long collaboration, which began in 1887, with her

cousin Edith Oenone Somerville (q.v.). She died Dec. 21, 1915.

Ross, SIR RONALD (b. 1857). British physician. Born May 13, 1857, and educated at S. Bartholomew's Hospital, London, he entered the Indian Medical Service, 1881, and took up the study of malaria. In 1897-98 he discovered the life history of malaria parasites in mosquitoes, and in 1899



Sir Ronald Ross, British physician
Elliott & Fry

he was leader of the expedition to W. Africa. Ross was awarded the Nobel prize for medicine in 1902. Throughout the Great War he had the sole control in connexion with malaria problems. He was made K.C.B., 1911, and K.C.M.G., 1918.

Rossa, O'DONOVAN (1831-1915). Irish Fenian leader. Born at Rossbarbery, co. Cork, his real name was Jeremiah O'Donovan, and he early became connected with the Fenian brotherhood. Sentenced

to 20 years' penal servitude for treason-felony in 1865, he was elected M.P. for Tipperary, 1869, and was released conditionally in 1871. He then resided in the U.S.A., and opened a fund for the support of dynamite outrages. He visited England in 1894, and attempted to address the House of Commons. Expelled from the Fenian brotherhood in 1886, he had little political influence in later days, and died in New York, June 29, 1915.

Rossall School. English public school. It stands on the sea shore at Rossall, Lancashire, 3 m. from Fleetwood, its station. Founded in 1884, it was incorporated in 1890, and consists of nine houses. There is a separate preparatory school.

Ross and Cromarty. County of Scotland. One of the largest in the country, its area being 3,089 sq. m., it consists of the two counties of Ross and Cromarty, which were separate until 1889. It has a long, irregular coast-line, pierced by Dornock Firth, Cromarty Firth, and Beaulie Firth on the E., and by Lochs Broom, Ewe, Torridon, Carron, and Alsh, and the Gairloch on the W. It includes parts of Lewis and several of the smaller islands of the Hebrides.

The surface is very mountainous, the highest peak being Carn Eige (3,877 ft.), Mam Soul (3,862 ft.), Ben Wyvis, Ben Attow, and several others, all over 3,000 ft. Of the rivers the chief are the Orrin, the Oykel, separating it from Sutherlandshire, and the Conon. In the county are lochs Maree, Fannich, Luichart, Glass, and many others. Most of the surface is given up to deer forests; elsewhere sheep and cattle are reared; the fisheries are valuable, and game is abundant. The Highland Rly. serves the county. Dingwall is the county town, others being Stornoway, Tain, Cromarty, Fortrose, Invergordon, and Strathpeffer.

Ross and Cromarty originated as two earldoms, having previously been included in the province of Moray. Ross was made a county in 1661, and Cromarty in 1685. The latter consisted of detached pieces of territory scattered throughout Ross-shire, a fact which made their union desirable. One member is returned to Parliament. Pop. 77,000. See History of the Ancient Province of Ross, R. Bain, 1899.

Rossano. City of S. Italy, in the prov. of Cosenza. It is 28 m. N.E. of Cosenza near the Gulf of Taranto. A well-built walled city, it contains an old castle, a Byzantine cathedral, and a library with a valuable MS. of the Gospels. Silk, olive oil,



Rossall School. Main gateway and school buildings

marble, and alabaster are the principal products. Pop. 13,000.

Rossbach, BATTLE OF. Battle of the Seven Years' War. In it Frederick II inflicted decisive defeat on the German and French forces, Nov. 5, 1757. Rossbach is a small village of Prussian Saxony, 22 m. W.S.W. of Leipzig. The allied troops crossed the Saale with a view to attacking Leipzig, and took up a strong defensive position on the left bank.

Soubise attempted to outflank Frederick, who, making a feint retreat, drew the allies from their strong position, and suddenly attacked. Within two hours the

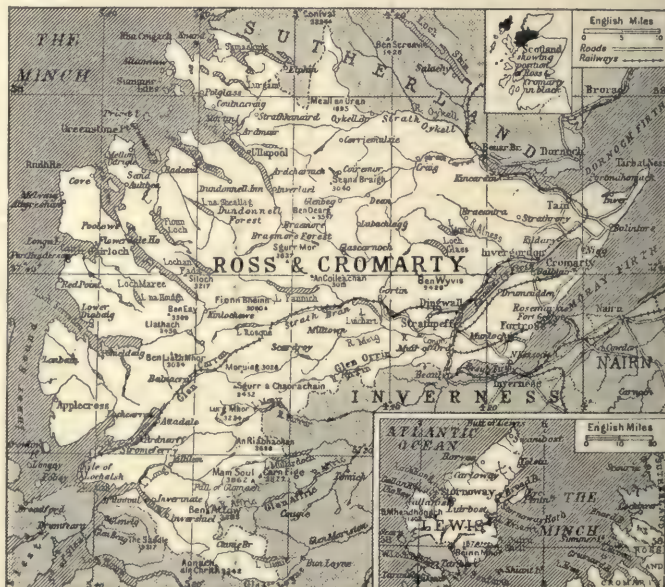
Aegeri, its highest point is Wildspitz, 5,190 ft. A road leads to the summit from Unter-Aegeri, a bridle path from Steinerberg, and



Rosberg, Switzerland. Village of Arth at the foot of the mountain

Frith

a footpath from Sattel station on the Rothenthurm line. From it descended the landslip of 1806, which buried four villages and 457 people. See Goldau.



Ross and Cromarty. Map of the large Scottish county. Inset, part of Lewis and smaller islands of the Hebrides included in the county

allied armies were completely scattered, the Germans retreating into Bavaria, and Soubise making northward. See Frederick II; Seven Years' War.

Rosberg. Mountain of Switzerland. In the cantons Zug and Schwyz, between the lakes of Zug, Lowerz, and

Ross Castle. Ancient tower or keep on Ross Island, Killarney, Ireland. Built in the late 14th century, a stronghold of O'Donoghue Ross, head of a clan under MacCarthy More, it was granted in 1588 by Elizabeth to Sir Valentine Browne. When Lord Muskerry was defeated by Lord Broghill in 1652, he took refuge in Ross Castle, which later surrendered to the Cromwellian leader Ludlow. See Killarney, Lakes of.

Rosse, WILLIAM PARSONS, 3RD EARL OF (1800-67). British astronomer. Born at York, June 17,



3rd Earl of Rosse,
British astronomer

1800, he was educated at Trinity College, Dublin, and Magdalen College, Oxford. From 1823-34 he represented King's County in parliament, resigning in the latter year in order to devote himself to astronomical pursuits. He carried out a series of improvements in the great reflecting telescope at Birr Castle, in 1839, completing a 3 ft. reflector, and in 1842-43 two each of 6 ft. diameter. With one of these latter telescopes Rosse made many valuable observations of nebulae and star clusters, and announced the discovery of spiral nebulae. He was president of the Royal Society 1849-54. He died Oct. 31, 1867.

Rosselli, COSIMO (1439-1507). Italian painter. Born at Florence, he studied under Neri de Bicci, worked at Rome, where he was employed on the decoration of the Sistine Chapel, and at Florence, where his masterpiece is a fresco in S. Ambrogio. Piero di Cosimo and Fra Bartolommeo were his pupils. He died at Florence.



Cosimo Rosselli,
Italian painter
After Vasari

Rossellino, BERNARDO (c. 1409-64). Italian sculptor and architect. Born at Settignano, he worked chiefly at Florence with his younger brother Antonio. One may cite among his sculptures the Beata Villana tomb in S. Maria Novella, Florence, and the mausoleum of Leonardo Bruzzi, of Arezzo, in Santa Croce. He built the Vatican for Pope Nicholas V, and executed important works at Siena, Spoleto, and Pienza. He died at Florence.

Rossetti, CHRISTINA GEORGINA (1830-94). British poet. She was born in London, Dec. 5, 1830, and delicate in health from the age of 15. On the threshold of womanhood an unfortunate love affair made a deep impression on her mind, and helped to give to her writing its note of sadness.

A keen lover of books, animals, and flowers, her first verse was written in 1842, and much of the best of it was the work of her



Christina G. Rossetti

After D. G. Rossetti

earlier years. Her knowledge and affection for country scenes was gained from visits in childhood to Holmer Green, near Little Missenden, Bucks. As published, her works include Verses, privately printed, 1847; Goblin Market and Other Poems, 1862; The Prince's Progress and Other Poems, 1866; Sing-Song, a book of nursery rhymes, 1872; A Pageant and Other Poems, 1881; Verses, 1893; New Poems, 1896. She also wrote some short stories and devotional prose, notably Time Flies, 1885. Her death took place, after a long and painful illness, Dec. 29, 1894, and she was buried in Highgate cemetery. A memorial reredos-painting, designed by Burne-Jones and executed by T. M. Rooke, was afterwards placed in Christ Church, Woburn Square.

In English literature Christina Rossetti takes her place with Herbert, Crashaw, and Vaughan, and, as a poet of the Oxford Movement, with Keble and Newman. While death, the grave, and renunciation are constantly her themes, and some of her lyrics, When I am dead, my dearest, for example, are poignant in their sadness, none of them is morbid or gloomy, and flashes of lambent fancy recall a

spirit that bore physical and mental trial with steady fortitude and abiding cheerfulness. Dr. Richard Garnett justly compared the imaginative quality of Goblin Market with The Ancient Mariner, and declared its insight Shakespearean. With Goblin Market may be recalled The Prince's Progress, Monna Innominata; a Sonnet of Sonnets, Amor Mundi, Vanity of Vanities, Looking Forward, and The Convent Threshold. Christina Rossetti's work, remarkable for its simplicity, purity, and flexibility, possesses qualities that must always appeal to the sorrowful and afflicted. See Poetical Works of C. R., with Memoir and Notes, W. M. Rossetti, 1904; Lives, E. A. Proctor, 1896, and Mackenzie Bell, 1898; The Family Letters of C. R., ed. W. M. Rossetti, 1908.

Rossetti, DANTE GABRIEL (1828-82). British poet and painter, whose full name was Gabriel Charles Dante Rossetti. Born at Charlotte Street, Portland Place, London, May 12, 1828, he was the eldest son of Gabriele and Frances Mary Rossetti, refugees from Naples. His father was professor of Italian at King's College, London, at the school attached to which Dante Rossetti was educated. He studied drawing under J. S. Cotman, and entered Cary's Academy in Bloomsbury, 1842, and the R.A. schools, 1846. His literary power developed in advance of his painting; The Blessed Damozel and several sonnets were composed about 1847. In 1848, however, he became the pupil of Ford Madox Brown, a step which led to his acquaintance with Holman Hunt and Millais, and incidentally to the formation of the Pre-Raphaelite Brotherhood.

About 1852 he became engaged to Elizabeth Eleanor Siddal, the model for his Beatrices and of



D. G. Rossetti

After G. Porten

Millais's *Ophelia*. In 1855 he made the acquaintance of William Morris and Burne-Jones. and two years later took a leading part in the decoration of the Oxford Union, contributing *The Vision of Lancelot*. In 1860 he married Miss Siddal, but she died in 1862, and in 1867



Elizabeth Rossetti

After D. G. Rossetti

his own health began to give way. He increased his nervous malady with doses of chloral, and, after an attempt to poison himself with laudanum, 1872, and going through a severe illness in 1877, he was seized with partial paralysis in 1881, and died at Birchington April 9, 1882.

Rossetti ranks higher as a poet than as a painter; the technicalities of the latter art presented difficulties which he evaded rather than grappled with. But inasmuch as his painting is the vehicle for the expression of his sensuous emotions, he is the true if not perfect artist in this, as in his other sphere of activity. His best known pictures are: *Ecce Ancilla Domini*, 1850, now in the Tate Gallery; *Meeting of Dante and Beatrice*, 1851; *The Annunciation*, 1855; *My Lady Greensleeves*, 1858; *Beata Beatrix*, 1863; *The Beloved*, *Monna Vanna*, and *Sibylla Palmifera*, 1866; *Pandora*, 1871; *The Blessed Damozel*, 1874; *Fiammetta*, 1878; and *Dante's Dream*, 1881, in the Walker Art Gallery, Liverpool. Conspicuous among his literary productions are his translations of Early Italian Poets, published with Ruskin's financial help in 1861, and the two volumes of *Ballads and Sonnets*, issued respectively in 1870 and 1880. See *Annunciation*; *Beatrice*; *Blessed Damozel*; *Pre-Raphaelites*.

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Rossetti, WILLIAM MICHAEL (1829-1919). British man of letters. Born Sept. 15, 1829, the second son of Gabriele Rossetti and brother of Dante Gabriel and Christina, he was educated at a private school and at King's

College, London, becoming a clerk in the civil service in 1844. In 1869 he became assistant secretary of inland revenue, and he retired in 1894. Rossetti found time for the artistic and literary tastes which he shared with his brother and sisters. He was a member of the

W. M. Rossetti,
British man of letters
Russell

Pre-Raphaelite Brotherhood, recording in his diary its proceedings, and editing *The Germ* (q.v.). His translation of Dante's *Hell*, 1865, was closely followed by *Fine Art*, Chiefly Contemporary, 1867; he wrote a *Life of Keats*, 1887, edited Chaucer and Shelley, William Blake and John Ruskin; wrote on the Pre-Raphaelites, and contributed articles on art to *The Critic* and *The Spectator*.

Rossetti's copious work, both as editor and memorialist, on his own family, including a Memoir of his brother, 1895, and a reprint of his father's autobiography, is always illuminating. Widely read and of untiring industry, his various duties as a civil servant seem to have given no check to that almost continuous flow of sound criticism and fascinating reminiscence which presents a unique revelation concerning the strongest and most original artistic movement of the Victorian age. He died Feb. 5, 1919.

Rossi, FRANCESCO DEI (1510-63). Italian painter, known as Il Salviate. Born at Florence, he

Francesco Dei Rossi,
Italian painter

studied under Andrea del Sarto and Baccio Bandinelli. He worked at Rome for Cardinal Salviate, his principal patron; at Venice, Florence, and in France, at the château of Fontainebleau. An erratic and reckless disposition prevented his taking advantage of great opportunities. He died of fever at Rome. There are two examples of his work in the National Gallery, London.

Rossi, GIOVANNI BATTISTA DEI (1494-1541). Italian painter, commonly known as Il Rosso, and Maître Roux. Born at Florence, he evolved an inventive and original style from the study of Michelangelo and Parmigiano. From Florence he went to Rome,

where he had a good reputation. When the town was sacked in 1527, he escaped to Volterra, then made his way to France, where he designed the great gallery at the château of Fontainebleau, and painted a series of frescoes illustrative of the life of Francis I. A charge of theft which in a hasty moment he brought against his friend Pellegrini led to the latter being put to the torture before being declared innocent, and this event so preyed upon Rossi's mind that he committed suicide.

Rossi, LUIGI DE (b. c. 1600). Italian composer. He was born in Naples, but scarcely anything is known of his life. His opera *Le Mariage d'Orphée et d'Euridice*, 1647, was the first Italian opera given in Paris.

Rossignol. Lake of Nova Scotia, Canada. The largest lake in the prov., it drains by the Liverpool river to the Atlantic Ocean.

Rossini, GIOACHINO ANTONIO (1792-1868). Italian composer.

Born at Pescara, Feb. 29, 1792, he

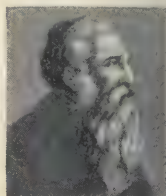
studied composition and cello playing at Bologna, 1807, and produced his first opera, *La Cambiale di Matrimonio*, 1810. His success



Gioachino Rossini

was instant, and several light pieces followed, and *Tancred* was produced at Venice in 1813. The Barber of Seville appeared at Rome, 1816, and became universally popular. Rossini composed twenty operas between 1815-23, these including *Otello*, 1816, *La Gazza Ladra*, 1817, *La Donna del Lago*, 1819, and *Semiramide*, 1823, as well as several cantatas, visited England, 1823, and settled for a time in Paris, where William Tell, his last opera, was produced in 1829. His famous *Stabat Mater* was written in 1832 and 1841, and first sung as a whole in 1842. After living in Bologna and Florence, 1837-55, he settled in Paris, but wrote little save church music and piano-pieces, dying Nov. 13, 1868.

Rossini had a great gift of flowing melody, and his work is highly characteristic of the Italian tradition. There is much that is turgid

G. B. Dei Rossi,
Italian painter

and cloying in his writing, but the best of it, such as *The Barber of Seville*, has unfailing freshness and charm. See *Opera*; consult also *Rossini* and his *School*, H. S. Edwards, 1881. *Pron* Rossee-nee.

Rossland. Town of British Columbia, Canada. In the Kootenay dist., it is only 6 m. from the U.S. boundary and is served by the C.P.R. and C.N.R. It is a centre for the surrounding iron, copper, and gold mines, and was made a town in 1897. Pop. 2,100.

Rosslare. Seaport of co. Wexford, Ireland. It is 6 m. from Wexford, and is served by the G.S. &

Scottish advocate in 1754, but was called to the English bar at the Inner Temple, 1757. He was M.P. for the Ayr burghs, 1761, and for Richmond, Yorkshire, 1768, and then joining the Whigs, sat for Bishop's Castle, Shropshire, 1769-74 and 1778-80. After violently attacking Lord North, he suddenly returned to the Tory party. He was made solicitor-general, 1771, attorney-general, 1778, chief justice of the court of common pleas and Baron Loughborough, 1780, and lord chancellor, 1793-1801, being on his resignation created earl of Rosslyn. He died Jan. 2, 1805.



Rosslare, Ireland. Harbour and quays for the steamboat service of the Great Western Railway from Fishguard, Pembrokeshire

By courtesy of the G.W. Rly., London

W. and Dublin & S.E. rlys. Formerly a fishing village and a coast-guard station, with an old church, it came into use as a port in 1906, when the harbour was reconstructed to serve as a terminus for the route from Fishguard opened by the G.W. Rly. in connexion with the G.S. & W. line. Pop. 670.

Rosslyn, EARL OF. Scottish title borne by the family of Erskine. In 1801 the lawyer, Alexander Wedderburn, was made earl of Rosslyn, a title which passed on his death, in 1805, to his nephew, James St. Clare Erskine (1762-1837), son of Sir Henry Erskine, Bart. He was an M.P., 1782-1805, and was a Tory minister under Wellington and Peel, being lord privy seal, 1829-30, and lord president of the council, 1834-35. His descendant, James Francis (b. 1869), became the 5th earl in 1890. The earl's eldest son is known as Lord Loughborough. See *Roslin*.

Rosslyn, ALEXANDER WEDDERBURN, 1ST EARL OF (1733-1805). British judge, better known as Lord Loughborough. Born in Edinburgh, Feb. 13, 1733, the son of a Scottish lord of session, he was educated at Dalkeith and Edinburgh University. He became a



1st Earl of Rosslyn.
British judge
After Reynolds

An unscrupulous timeserver, he punished seditious sympathisers with the French Revolution with great rigour.

Ross Rifle. High power rifle manufactured by the Ross Rifle Company of Canada. It was the standard weapon of the Canadian troops and the reserve equipment of the British navy. A bolt action weapon for charger loading, it is provided with a box magazine, fires the standard .303-in. British rifle cartridge, and is of similar general construction to the long Lee-Enfield. It is reputed to be a more accurate weapon than the Lee-Enfield, an advantage over the latter being that it is provided with an aperture or "peep" sight for all ranges; also it can be fired more rapidly, as the bolt is semi-automatic in action, merely requiring pushing and pulling backwards and forwards without any turning movement. The bolt head is locked to the chamber by an interrupted screw, similar to that used for the breech blocks of big guns.

In the Great War the Ross rifle, despite its advantages, was discarded for the land service in favour of the Lee-Enfield, as it was found that its bolt action was not satisfactory when required to work when contaminated with sand or mud, the frequent jams in such circumstances more than counterbalancing its advantages. See *Breech Block*; *Firearms*; *Guns*; *Lee-Enfield*; *Rifle*.

Ross Sea. Part of the Arctic Ocean, lying between South Victoria Land and King Edward VII Land. It contains Ross Island, and is blocked to the S. by the Ross Ice Barrier. During the S. summer it is usually free from ice, and thus formed a convenient entrance for the explorers of Antarctica. Scott and Amundsen both used its S. shore as a base. Sir J. C. Ross, when he led the expedition of the *Erebus* and *Terror* to the Antarctic in 1839-43, reached lat. 78° 10' S. Its coasts, with adjacent islands and territories, were annexed to New Zealand in 1923. See *Antarctic Exploration*.

Rostand, EDMOND (1868-1918).

French poet and dramatist. Born at Marseilles, April 1, 1868, his earliest play,

Le Gant Rouge, was a failure, but in 1894 *Les Romanesques*, produced in England as *The Fantasticks*, made it clear that a writer had



Edmond Rostand.
French poet

arisen who might restore the poetic drama to the French stage; the possibility seemed assured with the success of *La Princesse Lointaine* in 1895. In 1897 came Rostand's great triumph with *Cyrano de Bergerac*, which gave the author a world-wide success. *L'Aiglon* followed in 1900, and in 1901 the author was elected to the French Academy. In 1910 came, after various delays, the fantastic play *Le Chanteur*, all the characters of which were represented as fowls. *Les Musardises*, a collection of his early poems, was published in 1911. Rostand died in Paris, Dec. 2, 1918. See *Edmond Rostand*, J. Haraszti, 1913; *Le Théâtre d'Edmond Rostand*, J. Suberville, 1919.

Roster (Dutch *rooster*, grid-iron). Term used to designate a list or plan showing the order or rotation in which officers, men, or bodies of troops are required to undertake turns of duty. It is also occasionally used, especially in the U.S.A., to indicate a simple list of officers, divisions, regiments, etc., with various particulars.

Rostock. Town of Germany. In Mecklenburg-Schwerin, it stands on the left bank of the Warnow, 60 m. N.E. of Schwerin. It consists of an old, middle, and new town, with several suburbs. In the Neuer Markt is the Gothic Rathaus, dating from the 14th century. The church of S. Mary contains a Romanesque font of 1290, and an astronomical clock. Linen is

manufactured, and there are breweries and distilleries, vinegar, soap, and colour factories, and ship yards. There is a large trade in grain, cloth, horses, and cattle. Its outport is Warnemünde. The city has a university, and was the birth-place of Blücher. Rostock was burnt by the Danish king Waldemar I in 1161, and besieged by the Danes and Russians in 1715-16. In the 14th century it joined the Hanseatic League, of which it became one of the most important members. Pop. 65,000.



Rostock, Germany. University buildings and statue of Blücher in the foreground

Rostopchine, FEODOR VASILEVITCH, COUNT (1763-1826). Russian soldier. He was born March 23, 1763, and entered the army. After holding various military and civil offices, and winning the favour of Paul I, he was appointed, early in 1812, governor-general of Moscow. In this capacity he was publicly charged with the responsibility of setting fire to the city when the French occupied it in 1812. In 1823 he issued a vindication of himself entitled *The Truth About the Burning of Moscow*, but afterwards recanted a good deal of his denial. He attended the Congress of Vienna, but retired soon afterwards. He died in Moscow, Feb. 12, 1826.

Rostov. Town of Central Russia, also called Great Rostov. It is in the govt., and 35 m. S., of Yaroslav, on Lake Nero and the Moscow-Yaroslav rly. It is a very old town, mentioned by the chronicler Nestor as early as 862, and famous for its antiquities, chief of which are the Kremlin and the Uspenski cathedral. The prominent industry is the manufacture of ikons. Pop. 18,000.

Rostov-on-the-Don. Town of Russia. It stands on the right bank of the Don, in Don Cossack territory, and owes its importance to its facilities for navigation and its position at the junction of three rly. systems. Of its many industries the most flourishing is the manufacture of tobacco. The chief exports are grain and wool, Rostov being the centre of the grain trade in that part of Russia. It was captured by the Germans in May, 1918. Pop. 205,000.

Rostrum. In modern usage, any raised platform from which a speaker addresses an audience.

In ancient Rome, only in the plural form, *rostra*, the word was used to indicate the tribunal or platform in the Forum. From it magis-



Rosyth, Scotland. Blackmarch Crescent and, top, Road D.27 and Road D.31
Valentine

trates addressed the assembly of the people. It was so named because it was ornamented with the beaks or rams (*rostra*) of ships captured from the enemy in naval battles. See Forum; Rome.

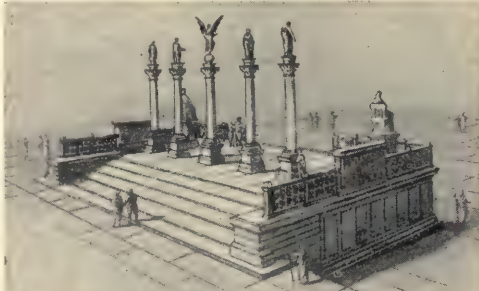
Rosyth. British naval base on the Firth of Forth. It has been developed into a dockyard ranking with the older naval yards of the country—Portsmouth, Devonport,

and Chatham. Rosyth was one of the principal bases, and very important in particular as a docking and repairing base of the Grand Fleet during the Great War, and the headquarters of the cruiser squadrons. Its inception coincided with the change of the naval front from the Channel to the N. Sea. The intention to establish the base was announced in March, 1903, but arrangements for taking over the land and the making of plans occupied several years, and actual work did not begin until March, 1909. The position is above the Forth Bridge at St. Margaret's Hope on the N. side of the estuary, where the depth in the middle was 45 or 50 fathoms.

The plan provided for the construction of a main basin covering an area of 55 acres, enclosed by a

sea-wall, and entered through a lock which would enable the biggest ships to pass in and out in all states of the tide. There was to be a dry dock, 750 ft. in length and 110 ft. in width, but a second dock was added to the scheme, and in 1913 a third, these admitting the longest ships in the navy. These docks are closed by sliding caissons, and the pumping plant is of enormous capacity. There were also planned a large submarine tidal basin, and ranges of workshops, stores, offices, in addition to extensive electrical power and pump ing stations.

The Great War found the dockyard, in its main features, completed or approaching completion.



Rostrum. Reconstruction of the rostra in the Forum of Ancient Rome

About 300 acres had been recovered from the sea, and the seawall had been constructed by sinking huge concrete monoliths to a firm bed in boulder clay or rock, each 40 ft. square and each weighing many thousands of tons, and shod with steel cutting shoes, weighing 50 or 60 tons. In 1913 3,000 men were employed, and work went on night and day. The plan included the building of 8,000 houses for the seamen and dockyard workers, and the expectation that the whole establishment would be completed by 1916 was fulfilled. Additional shops and offices were planned in August, 1914, and work was in active progress during the first years of the war. The resources were increased in the light of the new and enormous requirements, and provision was made for the docking, refitting, and repairing of ships of every class. A large coaling station was established, with very extensive oil tankage, and every equipment for rapidly supplying ships.

The great basin extends for about three-quarters of a mile from E. to W., and about half a mile from N. to S., and the submarine basin is on the E. Eastward of the dockyard the Firth of Forth was dredged to a width of 600 ft., and at low tide the water in the fairway is over 36 ft. deep. In the latter part of the war, the main elements of the Grand Fleet were transferred to Rosyth from Scapa Flow. See Dockyard.

Rotary Club. Movement among business men which takes for its motto "Service, not self." The idea of the Rotary Club originated with Paul Harris, a Chicago lawyer, who in 1905 sought to establish a little club of men, each representing a different trade or profession, for the interchange of opinion on business and other matters. Religion and politics were excluded from discussion.

The first Rotary Club was a luncheon club, but in a few years the number of Rotary Clubs was 200, and in 1911 the institution took root in Great Britain. During the Great War the British Rotary Clubs devoted themselves to many kinds of special war service. Rotarians gradually evolved an ethic of their own, founded on their motto, "Service, not self," and are establishing a kind of modern Freemasonry, without its formalities and secrecy.

In June, 1921, the 12th Annual Convention of the International Association of Rotary Clubs was held in Edinburgh, and was attended by over 1,000 business men from American Rotary Clubs. It

was stated that there were then 906 affiliated clubs, including 31 in Great Britain, and rotary membership is estimated at 65,000.

Rotary Engine. Type of steam engine. In the ordinary steam engine the first movement is reciprocating—the piston and its rod move to and fro, and the direction of this motion is reversed in every stroke. But this to-and-fro motion must in nearly all cases be converted into rotary or circular motion, in order that it may be conveniently utilised. A certain loss of power and complication of parts arise from this conversion, and it has long been the aim of inventors to make an engine which would give the necessary rotary motion directly, precisely as it is given by a water-wheel or water turbine. Such engines are called rotary engines. The earliest form of steam engine of which we have any record, that devised by Hero of Alexandria, 130 B.C., and the most modern form, the steam turbine, are both of this type.

Murdock's Engine

William Murdock devised a rotary engine in which motion was produced by passing steam between the teeth of two cog wheels fixed on parallel axles and enmeshed together and enclosed in a case, the effect of the steam being to turn the wheels round, of course, in opposite directions. Eighty years later Dudgeon, an American inventor, improved on Murdock's design, but did not make a satisfactory engine, the waste of steam escaping by the sides of the wheels still remaining excessive.

Another idea which has been much studied is based on the movement of Hooke's joint. The idea is applied in the form of disks fixed angle-wise on revolving shafts and enclosed in steam cylinders. Steam is introduced between the disks, and causes them to revolve with their axles, from one of which the power is taken. In their revolution the disks make contracting and expanding chambers. An engine of this type, known as the Bishop disk engine, was used for some time to drive a part of the printing machinery of The Times, but was discarded in 1857. A more modern form of disk engine was devised by Beauchamp Tower, and a number were made in Manchester, but again the difficulty of keeping the working parts steam-tight proved serious, and the engine did not come into general use.

Another type is known as the radial rotary, and has come into extensive use for aeroplanes, particularly a French design, the Gnome. This engine consists of a

number of cylinders, usually seven, arranged radially in a plane at right angles to the shaft which is to be rotated. The connexion is made by means of a crank and a "master" connecting rod screwed into the base of one of the pistons, the other connecting rods being attached to the head of the "master." The cylinders are all rigidly attached to a common frame, which revolves round a stationary crank and shaft.

While all these types of engine may be called rotary, it will in most cases be found that they are not purely rotary, but depend on some more or less veiled reciprocating movement. The first strictly rotary engine to attain practical success was the one devised by the Swedish engineer, de Laval, which in effect consisted of a disk which was blown round by jets of steam directed against its periphery. This has been eclipsed by the steam turbine introduced by Sir Charles Parsons. See Aero-engine; Engine; Turbine.

Rotation. Action of moving round a centre or of turning round an axis. The axis round which a body revolves is called the instantaneous axis of rotation. Rotation may also be defined as the change of direction of a vector (*q.v.*). In plants the flowing of protoplasm within the cell wall is called rotation. Any return or succession in a series is also called a rotation, *e.g.* rotation of the seasons.

Rotation. Term much used in agriculture for crops, grasses, etc., which are grown in turn. Rotation grasses are quickly growing, short-lived species of grasses and clovers grown as a "seeds" crop in a rotation, to stand as a temporary ley for one, two, or three years. For a one-year's ley ordinary red clover may be grown alone, being sown at the rate of 12 to 16 lb. per acre. The following are typical seed-mixtures, the figures giving the number of pounds per acre: For 1 year: Italian rye-grass 6; red clover 8; alsike 2; white clover 2. For 2 years: Italian rye-grass 4; perennial do. 6; cock's-foot 2; Timothy 2; cow-grass 6; alsike 2; white clover 2; trefoil 2. For 3 or 4 years: Italian rye-grass 6; perennial do. 12; cock's-foot 2; Timothy 2; cow-grass 4; alsike 2; white clover 2; trefoil 2.

This temporary grass crop, or the first year of the same, follows a cereal, and is often broadcasted among this after it is up, and then covered in by a horse-rake or seed-harrow. It may also be drilled and rolled in. Clovers are sometimes sown before the cereal appears

above ground, when the last harrowing of the latter covers them up. After the corn crop has been harvested the seeds are rolled in autumn on light land, or consolidation may be effected by sheep, though these must not be allowed to feed off the crop too much. Spring rolling is advisable. (See Agriculture: Pasture.)

The rotation of crops is the practice of growing crops from one year to another upon a given area in a certain succession. Experience shows that the best results cannot be expected in arable farming unless there is a systematic change of crops on a given piece of land. The continuous growth of one crop exhausts the soil in an unequal way down to a particular depth. Rotation means a more uniform drain on plant food, while alternation between shallow and deep-rooted crops secures that no part of the soil fails to be utilised. It follows also that manuring can be carried out with less expense, as the requirements of different crops vary, while at the same time insect and fungoid growths are kept in check. Root crops enable the land to be properly cleaned, and if fed to stock on the land check exhaustion by the return of manure. Cereal crops possess the great advantage that clover or "seeds" can be sown among them, ready to come on when they have been harvested, so that valuable time is saved. Leguminous crops add considerably to the store of nitrogen in the soil. Rotation is also absolutely necessary when stock are kept, and greatly furthers the economical distribution of labour through the farming year.

The best known rotation is the four-course or Norfolk kind, originally introduced from Flanders. It consists of a succession of wheat, roots, barley, and clover, together occupying a cycle of four years. Here, however, there is a great possibility of variation to suit particular soils and local climates. Other cereals may be grown instead of those named, *e.g.* oats in place of barley. There is also considerable choice in the matter of roots. Clover, again, may be replaced by rotation grasses (*q.v.*), while peas or beans can also be substituted. See Agriculture; Crops

Roten Turm OR **ROTER TURM**. Pass in the Transylvanian Alps, Rumania. It is 17 m. S. of Sibiu (Hermannstadt). The river Oltu has cut its way from S. Transylvania through the mountains which are the S. section of the Carpathians, to the plains of Wallachia. The rly. follows the river gap, which is overlooked by the



Roten Turm. Shattered Tower on the roadway through the pass in the Transylvanian Alps

peak Negoi, 8,320 ft., to the E. The road follows easier but more elevated ground W. of the gap. The square Red Tower, from which the pass takes its name, was built in 1533 at the S. end.

The pass was prominent in the fighting between the Rumanians and Austro-Germans in the Great War. The former seized it early in their invasion of Hungary, Aug., 1916, but it was soon retaken by the Germans. See Carpathians; Rumania, Conquest of.

Rothamsted. Pioneer agricultural experimental station, near Harpenden, Herts. It was founded by John Bennet Lawes (*q.v.*) in 1843, and endowed by him in 1889. With him from the first was associated Joseph Henry Gilbert (*q.v.*), and the two worked together until the death of Lawes in 1900. From the date of foundation until the present time a continuous series of most important researches has been carried out on the 40 acre Rothamsted estate and in the attached laboratories.

The personal experimental work of Lawes began when he succeeded to the estate in 1834, and led to the discovery of superphosphates. Wheat has been grown continuously on the Broadbalk field from 1843, and experiments have been made on different manures, including the question of loss in drainage water. It has been proved that this deep-rooted

crop needs less manure than some others, and is particularly benefited by the action of nitrate of soda. Similar experiments have been carried out on barley, oats, root crops, etc. See Agriculture; consult also Book of the Rothamsted Experiments, A. D. Hall, 1905, and the annual reports of the station.

Rothband Scheme. Scheme which resulted in the establishment of the King's Roll of Honour. H. L. Rothband, of the Albion Works, Pendleton, Manchester, published a pamphlet in 1917, proposing that a royal appeal should be issued to all employers of labour to give promises of employment for one or more disabled soldiers and sailors after the war. The scheme was taken up by a Parliamentary committee. See King's National Roll.

Rothbury. Urban district and market town of Northumberland, England. It stands on the Coquet, 11 m. from Alnwick, with a station on the N.B. Rly. Situated amid wild moorland scenery, it attracts many visitors. All Saints Church is an old cruciform building restored. Rothbury has been in the possession of the Percys for 600 years. Near is Cragside, the residence erected by the 1st Baron Armstrong. Market day, Mon (alternate). Pop. 1,300.

Rothenburg OR **ROTHENBURG-OB-DER-TAUBER**. Town of Bavaria, Germany. It stands on a plateau,



Rothenburg, Bavaria. Sieberturm, a gate in the old city wall

above the Tauber 36 m. W. of Nuremberg. The Gothic rathaus, 1240-50, has a tower 160 ft. high. The Gothic Franciscan church, 1285-1309, contains many tombs and a statue of S. Liborius, while the Protestant church of S. Jacob, 1373-1436, has notable carvings and stained glass windows. There

are cloth, flannel, and dye factories, and a trade in grain and wine. Rothenburg was captured by Tilly in the Thirty Years' War, an event commemorated annually by a procession and play. Pop. 9,000.

Rothenstein, WILLIAM (b. 1872). British artist. Born at Bradford, Yorks., he studied at the Slade School under Legros, and in Paris. He began to exhibit at the New English Art Club in 1893. His *Jews Mourning* is in the Tate Gallery, and he is well represented in other public galleries. He painted war pictures in France. In 1917 he was appointed professor of civic art at Sheffield University, and in 1920 principal of the Royal College of Art, S. Kensington.



William Rothenstein,
British artist
Russell

Rotherfield. Parish and village, Sussex, England. It is E. of Ashdown Forest, 8 m. S.W. of Tunbridge Wells, on the L.B. & S.C. Rly. The river Rother rises near here and flows for 30 m. to the English Channel. The church was once part of a monastery. Pop. 2,900.

Rotherham. County and mun. borough and market town of Yorkshire (W.R.), England. It stands at the junction of the Rother and Don, 6 m. from Sheffield, and is served by the Mid., G.C., and N.E. Rlys. The chief buildings are the fine cruciform church of All Saints, a Perpendicular edifice of the 15th century, town hall, grammar school, etc. The main industries are ironworks, brassworks, and the like; there are also saw-mills, works for making glass and chemicals, and it is a railway centre. On the old bridge across the Don are the remains of



Rotherham arms

a chapel. Rotherham existed in Anglo-Saxon times, but did not become a corporate town until 1871. Since 1918 it has sent one member to Parliament. Market days, Mon. and Sat. Pop. (1921), 68,045.

Rotherhithe. London district. A parish and E. ward of the met. borough of Bermondsey, served by the S.E. & C., L.B. & S.C., and Met. Rlys., it includes the Surrey Commercial docks (q.v.) and Southwark Park, 63 acres, opened to the public in 1869. The parish church of S. Mary, on the W. side of the entrance to the Thames Tunnel (q.v.), was rebuilt in 1715. Rotherhithe Tunnel, for foot passengers and vehicular traffic, connecting Union Road, Rotherhithe, with Commercial Road, Stepney, is 1 m. 440 yds. long, 510 yds. being under the Thames, and was opened June 12, 1908.

Once part of the royal manor of Bermondsey, Rotherhithe was known in the 17th century as Redriff. Admiral Sir John Leake was a native; and Swift made it the birthplace of Lemuel Gulliver. Here the Fighting Téméraire was broken up in 1838. Jacob's Island was the scene of Bill Sikes's death in Dickens's *Oliver Twist*. See Bermondsey; London.

Rothermere OF HEMSTED, HAROLD SIDNEY HARMSWORTH, 1ST VISCOUNT (b. 1868). British

newspaper owner, minister, and publicist. He was born at Hampstead, London, April 26, 1868. The younger brother of Viscount Northcliffe (q.v.), he was the second son of Alfred Harmsworth, barrister-at-law of the Middle Temple. He entered his brother's publishing business as a partner at the age of 21, and was thenceforth for many years intimately associated in his great successes, founding with him the Amalgamated Press, reorganizing the London Evening News, and establishing The Daily Mail, The Daily Mirror, and the Anglo-Newfoundland Development Company.



Gabriel

Rothermere

His executive talents contributed greatly to the prosperity of these.

In 1919 he founded and endowed with £20,000 a professorship of English Literature at Cambridge University in memory of King Edward VII. That same year he was created a baronet and severed his connexion with The Daily Mail, though he remained for many years principal proprietor of The Glasgow Daily Record and The Leeds Mercury. He was raised to the peerage as Baron Rothermere in 1914, and in that year acquired from his brother sole control of The Daily Mirror. In 1915 he founded The Sunday Pictorial (q.v.), in 1922 acquired The Daily Mail, and in 1923 most of the publications of Sir E. Hulton.

He held office under the government in the Great War, in 1916 becoming director-general of the Royal Army Clothing Department, and in 1917 air minister, at Mr. Lloyd George's invitation, for the purpose of amalgamating the Royal Flying Corps and the Royal Naval Air Service. After this had been accomplished he resigned in 1918 as the result of ill-health, receiving promotion to the rank of viscount in 1919. After the war he conducted an energetic campaign for economy in his newspapers, writing many articles himself.

He married Mary Lilian, daughter of George Wade Share, on July 4, 1893, and had three sons. The eldest, Harold Alfred Vyvyan Harmsworth (b. Aug. 2, 1894), after being twice wounded in 1915, received mortal wounds in 1917 in Boulton Wood, and died on Feb. 12, 1918, after receiving the M.C.

The second son, Vere Sidney Tudor Harmsworth (b. Sept. 25, 1895), was wounded at Gallipoli and fell in the battle of the Ancre in 1916. In memory of their gallantry he founded and endowed professorships of American History and Naval History at Oxford and Cambridge respectively. The third and only surviving son, Esmond Cecil Harmsworth (b. May 26, 1898), served in the war and in 1919 was elected M.P. for Thanet, when he was the youngest member of the House, and founder of the Anti-Waste party.

Roths. Police burgh of Morayshire, Scotland. It is near the river Spey, 10 m. from Elgin, with a station on the G.N. of S. Rly.



Roths arms

Distilling is the main industry. There are remains of a castle once a seat of the Leslie family. Pop. 2,000.



Rotherham, Yorkshire. Old bridge, with remains of chapel

Roths, EARL OF. Scottish title borne by the family of Leslie since 1457, or earlier. The 1st earl was George Leslie, who had estates in Fife. The 3rd earl was killed at Flodden. John, the 7th earl, became lord chancellor of Scotland after the Restoration, and was made a duke in 1680. He died without sons in 1681, when his daughter Margaret became countess of Roths. The title again passed to a woman when the 11th earl died in 1773, and again in 1817, in 1859, and in 1880, a most unusual record, and the consequence of a charter obtained in 1663. When the countess Mary, wife of Martin E. Haworth-Leslie, died in 1893, the titles passed to her grandson, who became the 19th earl. His seat is Leslie House, Fife, and his eldest son is called Lord Leslie. *Pron. Roth-ez.*



1st Duke of Roths,
Scottish royalist.
After Lely

Rothsay. Royal and mun. burgh and watering-place of Bute-shire, Scotland, also the county



Rothsay, Scotland. Town and harbour from Chapel Hill

town. It stands at the head of Rothsay Bay, a fine opening of the sea, on the E. side of the Isle of Bute. It is 40 m. from Glasgow, with a good modern harbour and pier. Rothsay is a popular tourist centre. The chief building is the castle, restored by the marquess of Bute in 1871-77. Other buildings include those erected for town and county business, churches, schools, the Norman Stewart Institute, and a museum. There is a public park. Fishing is an industry, and the town is a yachting centre. Rothsay was made a royal



Rothsay arms

burgh in 1400, about this time the castle being a royal residence. Pop. (1921) 15,218.

Rothsay, DUKE OF. Scottish title borne by the heir-apparent to the British throne. It was created in 1398 for David, the eldest son of Robert III, king of Scotland. He had previously been earl of Carrick. In 1399, owing to the illness of his father, he was made regent, but he was soon superseded, and imprisoned in Falkland by his uncle, the duke of Albany, and on March 27, 1402, he died there, it is said, of starvation. The title became one of those borne by the heir to the Scottish throne, and was included later among those of the heir to the British one.

Rothhorn, BRIENZER. Mountain mass of Switzerland. On the borders of the cantons of Berne, Lucerne, and Unterwalden, it attains an elevation of 7,715 ft., and the summit is reached by a rack and pinion rly. from Brienz (*q.v.*).

Rothley Temple. Elizabethan mansion in Leicestershire, England. It contains the chapel of a preceptory of the Knights Templars, is 5 m. from Leicester, and was the birthplace of Lord Macaulay. The parish of Rothley lies on the edge of Charnwood Forest, has a station on the G.C. Rly., and a pop. of 2,000. See Macaulay.

Rothschild. Name of a family of Jewish financiers. They derive their name from the sign of the red shield by which their house at Frankfort was known. Founded by Meyer Anselm Rothschild (1743-1812), a banker and money changer of Frankfort who made a fortune during the French campaigns in Germany, the family separated on his death, and his five sons, who were all made Austrian barons in 1822, extended the business through Europe. Anselm (1773-1855) continued at Frankfort, Solomon (1774-1855) went to Vienna, Nathan Meyer (1777-1836) went to Manchester in 1798 and moved to London in 1805, Karl (1788-1855) went to Naples, and Jacob

(1792-1868) to Paris. Nathan Meyer Rothschild, on settling in London, made a large fortune by his financial activities, in which he assisted the British and other European governments.

His eldest son, Lionel (1808-79), was best known by his labours for Jewish emancipation, and his second son, Anthony (1810-76), a London banker, was created a baronet in 1847. Lionel's son, Nathaniel Meyer (1840-1915), was educated at Cambridge, was M.P. for Aylesbury, 1865-85, when he was made a baron of the United Kingdom. An ardent philanthropist, he was president of the British Red Cross Society when he died, March 31, 1915. He was succeeded by his son, Lionel Walter (b. 1868). The family seat is at Tring, Hertfordshire.

Rothwell. Urban dist. of Northamptonshire, England. It is 4 m. from Kettering, with a station on the Mid. Rly. Boots, shoes, and clothing are manufactured. The chief buildings are the church of Holy Trinity in the Transitional style, with memorials to the Tresham family, and the market house,



a Renaissance building which, begun by a Tresham in 1577, remained unfinished

until the 20th century. Pop. (1921), 4,368.

Rothwell. Urban dist. of Yorkshire (W.R.). It is 4 m. from Leeds. The chief church is Holy Trinity, a fine building restored. The place has some manufactures, while around are coal mines which provide



Rothschild. Prominent members of the family. 1. Meyer Anselm, 1743-1812. 2. Nathan Meyer, 1777-1836, founder of the English house, from an old print. 3. Lionel Nathan, 1808-79. 4. Nathaniel Meyer, 1st Baron, 1840-1915. 5. Lionel Walter (b. 1868), 2nd Baron

employment for many of the inhabitants. In the Middle Ages the family of Lacy built a castle here. Pop. (1921), 15,249.

Rotifera (Lat. *rota*, wheel; *ferre*, to bear). Large group of aquatic animalcules. It is regarded by some zoological authorities as constituting a separate phylum of the animal kingdom, and by others as a class of the annelid worms. The rapid movements of the cilia which surround the fore part of the body, when examined under a microscope, have the appearance of a revolving wheel. They are all extremely small—the largest being just visible to the naked eye—and they are very abundant in ponds, while a few species inhabit the sea. Some of them are fixed by stems to objects, and others swim freely. They consist of a body terminated anteriorly by a ciliated disk and posteriorly by a foot for attachment or a tail-like outgrowth. The transparency of the body usually allows the internal organs to be well seen. The alimentary canal consists of a tube passing to an anal aperture at the hinder end of the body, and it is partly armed with minute teeth which serve the purpose of crushing the food which has been brought to the mouth by the action of the ring of cilia. Their food consists of still more minute organisms and particles of vegetable matter.

The body cavity is filled with fluid in which the organs float, being more or less loosely attached by cells of connective tissue. In some species part of the oesophagus can be everted and the teeth brought to bear upon the algae on which the animal browses. There appears to be no definite respiratory system, but the organs are aerated by the diffusion of water through the body wall and its subsequent expulsion from a kind of bladder. It is remarkable that so lowly an organism should possess a bilobed brain, which often bears eyes. The sexes are separate, and the young are produced from eggs. In some species eggs are apparently produced parthenogenetically in the summer months, and these are of two kinds—larger ones from which females are hatched, and small ones which result in males. In autumn the sexes pair and another type of eggs is produced. These have a thick shell and do not hatch out till the following spring.

About 700 species of rotifers are known, and several of them may usually be found by searching the weeds from any clear pond. They form very interesting objects for examination under the microscope, and some of their main features can

be made out with a good pocket lens. One species, *Melicertringens*, builds a tube of minute balls of clay or of other matter that may be held in suspension in the water. Rotifers are grouped into four classes—those that live in tubes, those that creep like a leech, those that swim freely, and those that progress by leaps. See Animal; consult also The Rotifera, C. T. Hudson and P. H. Gosse, 1886; Rotifera, M. Hartog, Cambridge Natural History, vol. ii, 1896.

Rotomohana. Lake of N. Island, New Zealand. On its shores, previous to 1886, were hot springs and terraces of siliceous sinter of brilliant colour, the most beautiful of their kind in the world. The terraces were destroyed by an eruption of Mt. Tarawera in 1886, and the lake is now a deep crater 2 sq. m. in area, in which a new warm lake has formed.

Rotorua. Lake of N. Island, New Zealand. Of volcanic origin, it is 20 m. from Mt. Tarawera, in the thermal spring region.

Rotorua. Township of N. Island, New Zealand. Near the lake of the same name, it is 171 m. by rail from Auckland, in the midst of the 150 m. stretch of country of geysers, hot and cold lakes, fumaroles, etc., which make it one of the most wonderful natural features of the world. A Maori centre, it is owned and managed by the state as a health and tourist resort, and within reach are facilities for fishing, deer stalking, and shooting of many kinds. Pop. 2,800.

Rotrou, JEAN DE (1609–50). French dramatist. The most important of the older contemporaries of Corneille, he was born at Dreux in Normandy, Aug. 21, 1609, and educated there and in Paris. He began by writing plays for various companies of actors; was for a time one of the five poets employed by Richelieu to carry out his dramatic ideas; and died, June 28, 1650, of the plague in Dreux, whither he went on learning that the mayor had fled from his post. His best work is to be found in his tragedies Saint-Genest and Venceslas. See Jean Rotrou, W. Sporon, 1894; Rotrou, T. F. Crane, 1907.

Rotten Borough. Popular name given, in the early decades of the 19th century, to those English boroughs which, with populations reduced to a handful, retained the right of returning members to Par-

liament. This anomaly, with many other abuses, was swept away by the Reform Act of 1832. See Borough; Commons, House of; Reform Act.

Rottenburg. Town of Württemberg, Germany. It stands on the Neckar, which separates it from the suburb of Ehingen, 6 m. S.W. of Tübingen. The buildings include the church of S. Martin and the Bishopshof, formerly a Jesuit convent. The latter houses a museum, while another building contains a valuable collection of Roman antiquities found on the site of the Roman station of Sumelocenna. Around is an important hop-growing dist., and there are woollen and spinning factories and breweries. It was added to Württemberg in 1805. Pop. 8,000.

Rotten Row. London riding track, in Hyde Park (*q.v.*). It runs W. from Hyde Park Corner to Coalbrookdale Gate, and returns E. on the N. side of the carriage drive between Albert Gate and Alexandra Gate. The name is derived from the soft layer of tan which forms the surface, or, more probably, from *route du Roi*, a road kept sacred to royalty.



Rotorua, New Zealand. Bath buildings at the Spa

Rottenstone. Name given to a porous, friable, siliceous rock used largely for cleaning and polishing steel, brass, and other metals, and wood. The rock consists mainly of aluminium silicate and carbonaceous matter, and is a decomposed siliceous limestone. The best rottenstone is found in Derbyshire and S. Wales.

Rotterdam. City and seaport of the Netherlands, in the prov. of S. Holland. It lies on the branch of the Rhine delta known as the Maas, joined here by a small river, the Rotte, and is 17 m. by rly. E.



Rotterdam arms

of the Hook of Holland, and 52½ m. by rly. S.S.W. of Amsterdam. The main part of the town, intersected by many quays and canals, is on the right bank; opposite the long quay called the Boompjes lies the North Island, and the suburb of

Feijenoord, with important harbours on the left bank.

Rotterdam is connected with the sea by the Nieuwe Waterweg, 1866-90, which admits large vessels from the Hook of Holland, and has a large transit trade. In 1920 tonnage entered amounted to 4,032,352, and tonnage cleared to 2,825,161. Imports include grain, metals, coal, petroleum, tobacco, coffee, and Dutch colonial produce generally; about one-half of Dutch industrial exports pass through Rotterdam. Shipbuilding with allied industries are of primary importance, and there are large manufactures of cigars, spirits, chemicals, cocoa, and sugar. The expansion of German overseas trade since 1850 greatly increased Rotterdam's transit trade, and there are important steamship lines running to the Dutch colonies, America, and Africa.

The Groote Kerk, or Church of S. Lawrence, begun in 1412, a large Gothic building, with unfinished tower, 1449-1651 (210 ft.), stands near the centre of the Hoogstraat, the chief street of the town. The Boymans Museum has a notable collection of Dutch paintings, and here also is the municipal museum of antiquities. There is an extensive zoological and botanical



Rotterdam. Plan of the central districts of the city, showing the principal docks and basins

garden, and the park lies to the W. of the town. The Exchange, 1772, with modern additions, and the Stadhuis or Town Hall, 1835, are noteworthy, as also are monuments to Erasmus and Hendrik Tollens, the poet (1780-1856), both natives of Rotterdam.

The city received its first municipal rights about the middle of the 14th century, but remained a

place of minor importance until the middle of the 19th century. Pop. 506,000. See Netherlands.

Rotti. Island of the Dutch E. Indies, lying off the S.W. of Timor. The people, chiefly Malays, produce rice, tobacco, sugar, cotton, and indigo, and are under native chiefs supervised by the Dutch resident at Baa. There are copra plantations. Area, 653 sq. m. Pop. 70,000.



Rotterdam, Holland. 1. The Delft Gate, the old north gate of the city, built in 1766. 2. A characteristic city canal. 3. The Witte Huis, a 10-storeyed apartment house, built 1897-98. 4. The Schie canal, in the outskirts of the city

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